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CIO

THE MAGAZINE FOR INFORMA

FIRST OF TWO SECTIONS

MARCH 1, 1998
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How An Integration Team Can Improve Your Company's vital signs

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Version A

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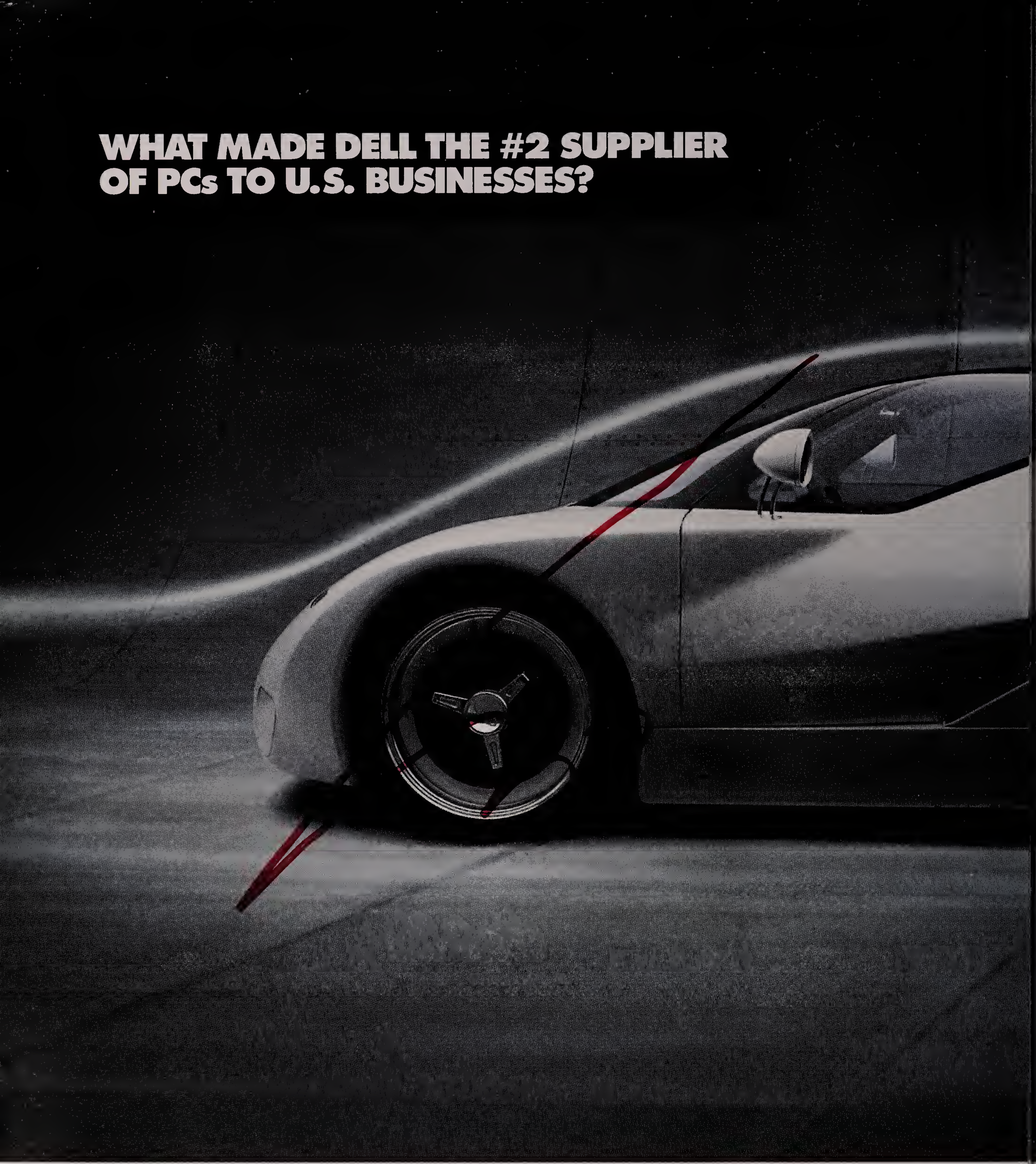

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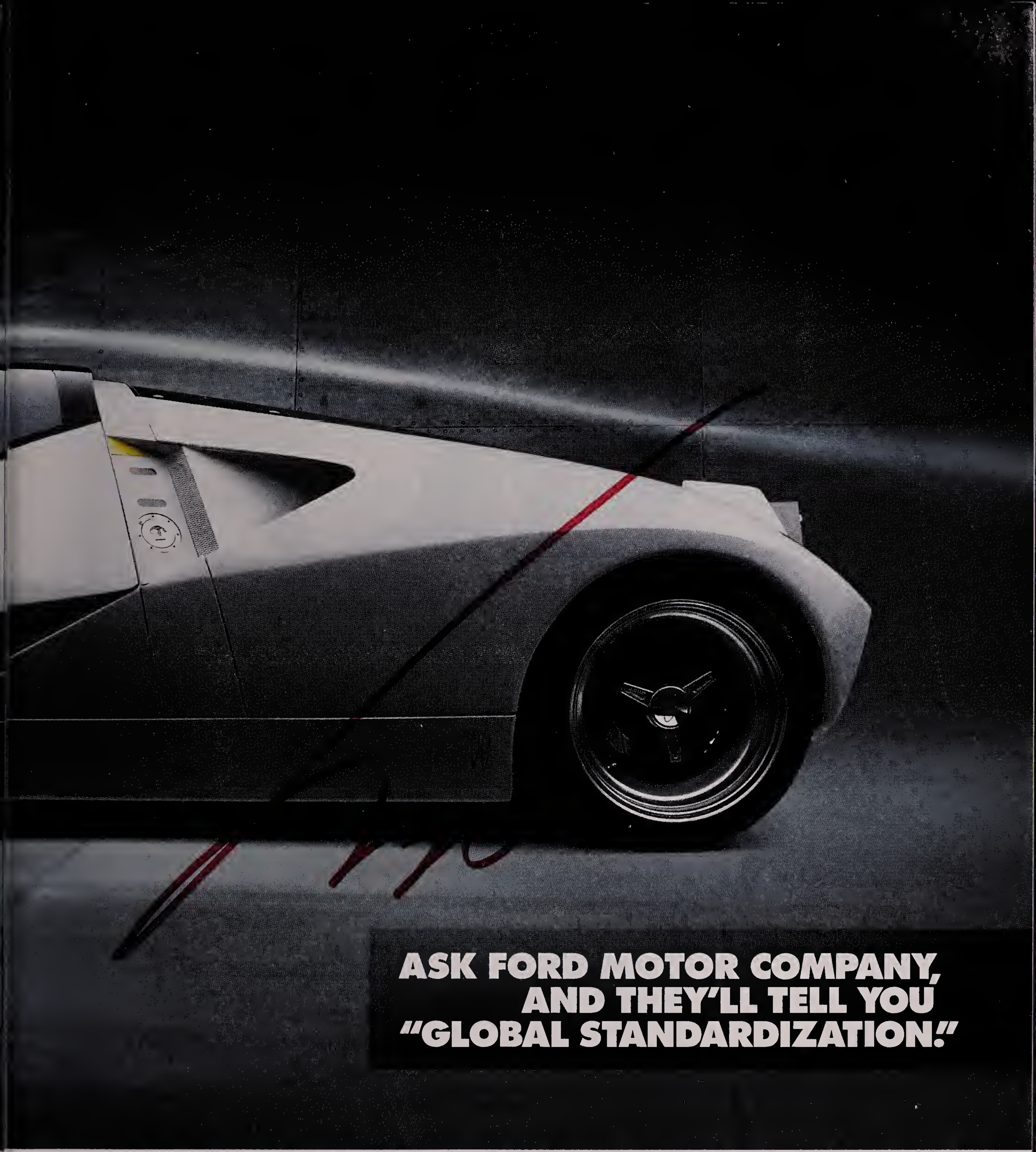

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CIO

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SECTION 1

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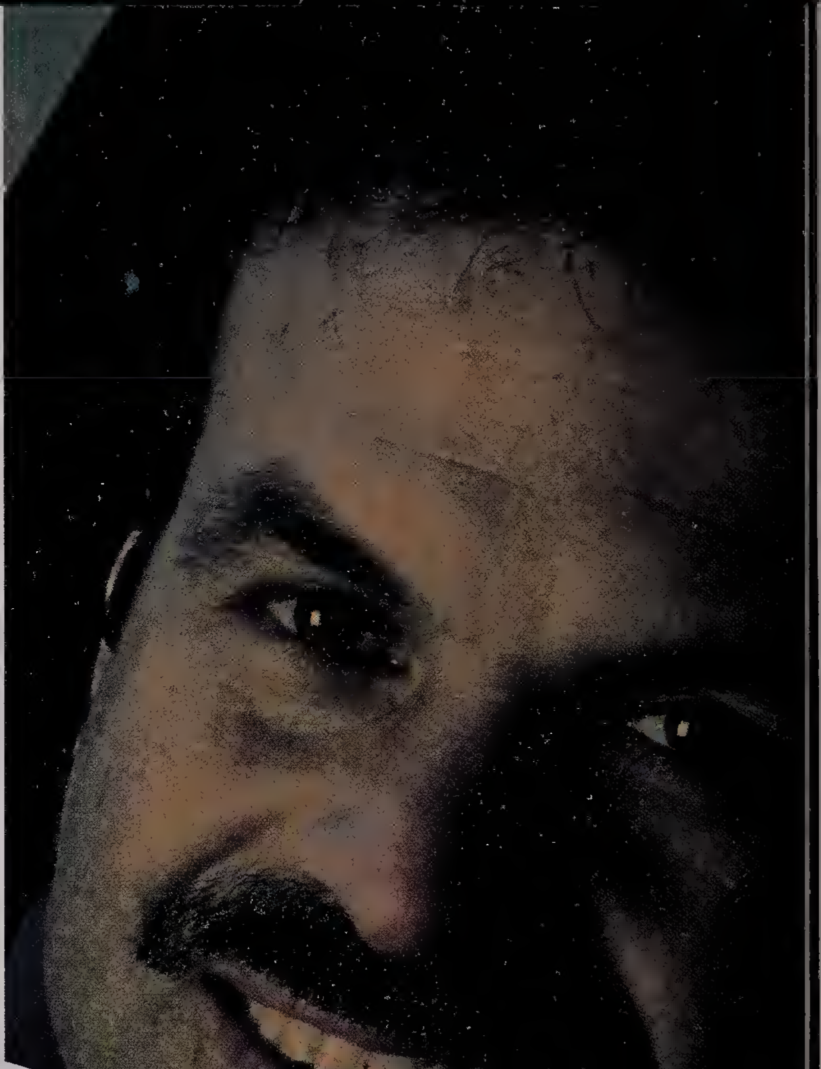

ON THE COVER:

With surgical care, CIO William "Buddy" Gillespie mended York Health System's disparate messaging systems.

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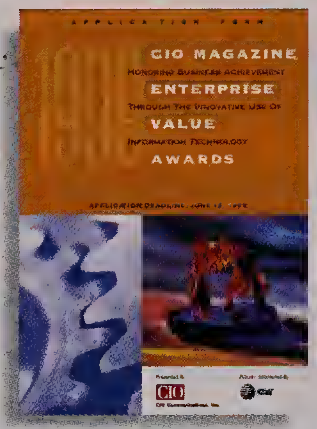

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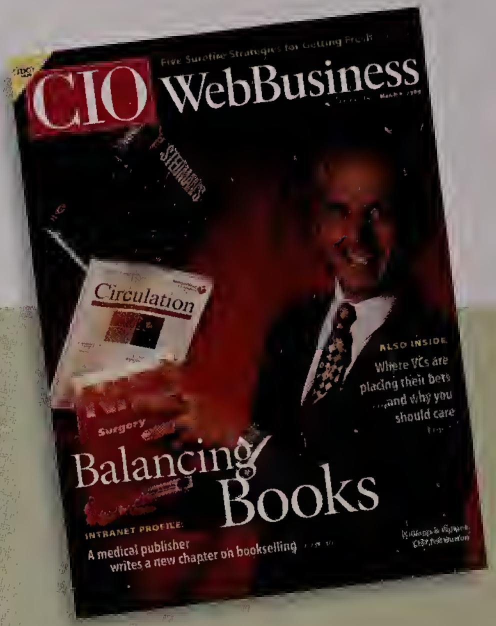
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ALSO INSIDE
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COVER STORY: INTRANET PROFILE Medical-book publisher Williams & Wilkins prescribed a potent intranet that is already boosting its chances of survival.

TECHNOLOGY INVESTMENT Five venture capitalists tell us what they look for in today's Web startups.

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In Box

LETTER FROM THE EDITOR, READER FEEDBACK AND HOW TO REACH US

Much of the attention being devoted to the IS staffing crisis (see our Dec. 15, 1997/Jan. 1, 1998, issue or visit our Web archives at *www.cio.com/archive*) focuses on emergency-type interventions. IS staffs are told to stem the tide of talent flooding out the door, replace that critical SAP developer today, get that arrested project going again. The situation is so dire at some companies that CIOs have little time to step outside the trauma room and think more holistically about the bigger picture. But long-term health requires a lot more than emergency care.

It's beyond cliché to say that people are key to an organization's success. Yet a baffling number of managers continue to treat the development of their human resources as an afterthought. It was probably a good eight years ago that *CIO* published its first articles about the need for better educational programs for technology talent, including the need for serious collaboration between academic institutions and the private sector. Yet there seems to have been little progress in that direction.

This is a big problem requiring big solutions. The government's recent promise of $28 million to address it is not going to make a dent. The Dept. of Labor is giving $8 million of that to build a recruiting Web site and $3 million for retraining downsized workers; the Dept. of Commerce will furnish $17 million to build awareness of high-tech opportunities and provide training for the poor. A laudable plan, certainly, but CIOs, of all people, know how quickly a few million can get spent.

The government, academia and private industries have got to get their collective acts together to do the following:

- Generate awareness about the opportunities available in technology jobs—I'm talking some serious image building here—beginning with K-12 and going to the university level and beyond.
- Provide relevant, useful education and training that combines business and technology in one coherent curriculum.
- Build attractive work-study programs that get students and educators alike out into the field to see what life in IS is really like.

You can help. Work with the schools in your area (and not just at the university level) to develop attractive programs for students. Lobby the government at all levels to get involved. While you can't stop paying attention to emergency care, if you don't step back and find a way to address the problem more holistically, the patient (your company, our economy) is going to croak.

We'll do our part too. *CIO* will continue to cover the staffing crisis on a regular basis. If you have ideas for features or columns you'd like to see, please send them in.

Abbie Lundberg

lundberg@cio.com

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COVER STORY: ENTERPRISE APPLICATIONS

Crossing No Man's Land

Successfully smuggling information across the no man's land between enterprise software packages can have more bottom-line impact than the applications themselves

BY CHRISTOPHER KOCH

When Tom Burn spots an anomaly in the Canadian city of Edmonton's payroll report, he wants to know more—say, how someone manages to work 140 hours in a single week.

CHOOSE ERP VENDORS WISELY

The city of Edmonton, Canada, and Tom Burn had lots of good choices among long-established vendors of broad portfolios of applications for local government ["Crossing No Man's Land," *CIO* Section 1, Dec. 1, 1997]. They didn't need to launch into their costly, painful and problematic exercise in ERP.

The Reader ROI box on Page 45 stated that "no single ERP package can handle all a company's needs." That simply hasn't been true in local government for at least 10 years. The front-end edits in any good payroll/HR package would not have permitted 140 hours to be entered for a single week in the first place. Moreover, even if 140 hours had been entered, exception reports included with the package should have identified the attempt to exceed the parameter and the existence of this outlier in the data entered for that pay period.

CIO should not let itself or its readers get seduced by big names from the commercial world when addressing the needs of vertical markets like local government. We have different requirements, which our own specialty vendors have met well for a long time.

Sheldon S. Cohen
President
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TIMELY SHARING

Thanks for a great article about the U.S. Atlantic Command's efforts to unleash the power of information ["Joining Forces," *CIO* Section 2, Dec. 1, 1997]. Marine Gen. John Sheehan and Vice Adm. Hal Gehman understand that the key is the ability to share the information in a timely manner throughout the organization, within necessary security constraints.

One point, however, was not adequately covered in the article: the fear of sharing information too soon. Both Sheehan and Gehman were bold in this regard. Gehman went so far as to make his daily staff meeting available throughout the organization by broadcasting it live on USACOM's video network. Not all of the attendees were thrilled with this dissemination of "raw data," but Gehman prevailed. This took a true commitment to information sharing (assisted somewhat by the fact that Gehman had more stars on his collar than did the other attendees). More important, it took confidence and guts!

Jim Downey
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The writer is a former director of USACOM's Command, Control, Communications and Computers department.

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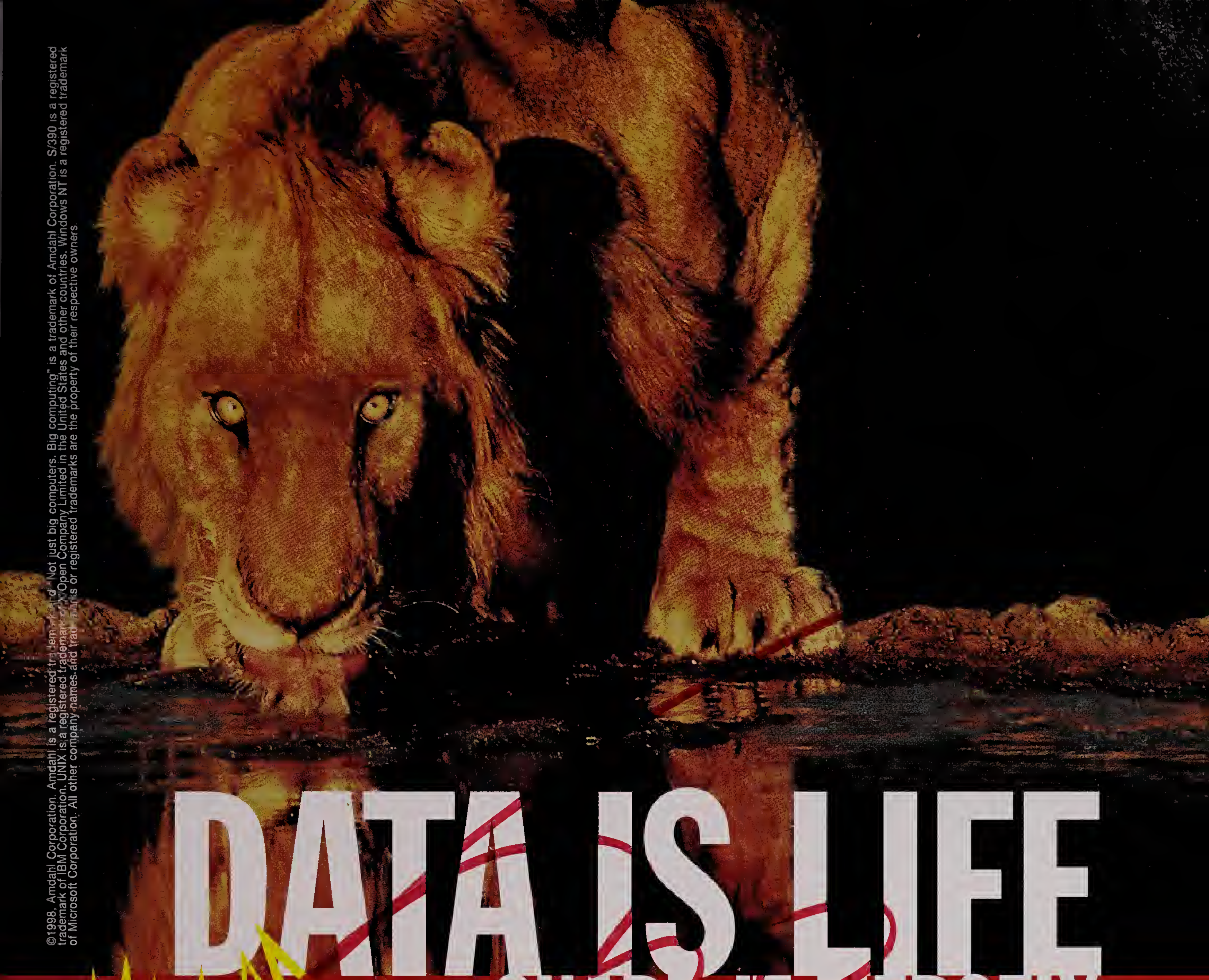

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Publisher's Note

I remember the moment well.

Vice President Al Gore, in an East Room ceremony last July, strode to the podium to introduce the administration's views on electronic commerce. Underscoring the content of the report, "A Framework for Global Electronic Commerce," his key comment was, "First and foremost, the report is based on the [beginning of the] Hippocratic Oath: We intend to do no harm."

Some might say that was a cyberversion of the infamous line, "I'm from the government and I'm here to help," but many gave the report, written under the direction of Presidential Senior Advisor Ira Magaziner, high marks for its candor. It inspired, in part, a bipartisan bill called the Internet Tax Freedom Act now making its way through Congress.

PHOTO BY WEBB CHAPPELL

In essence, the Internet Tax Freedom Act (see *www.aop.org/legis/hr1054.html*) calls for a five-year moratorium on new taxes and regulations aimed at computer transactions on the Internet. One might think that with both parties and the administration supporting this bill, it will be a cinch to pass.

But all is not quiet on the cyberfront.

The National Governors' Association, headed by Ohio Gov. George Voinovich, sees things differently. The association is intent on defeating the bill, which the governor and the association see as having a negative impact on state tax coffers.

Gov. Voinovich and the NGA are dead wrong. Electronic commerce is the most potent vehicle to increase tax collection. They should do the following: Embrace the Internet. Create enlightened state policy that encourages businesses to increase sales on the Net. Use the Internet to increase the aggregate top line of every business in every state. Promote policy that ensures the widespread deployment of affordable bandwidth to every residence and business in every state. Sell, sell, sell!

Generally, the more revenue a company produces, the more taxes it pays. Growing businesses hire more employees. And guess what? Most employees pay their fair share of taxes, too.

Readers of *CIO* represent the most powerful businesses in the world. If Gov. Voinovich and the National Governors' Association get their way and the Internet Tax Freedom Act is defeated, the electronic commerce plans of your businesses will suffer.

What's your view? Do you agree with Gov. Voinovich or should the readers of *CIO* collectively tell the National Governors' Association to get out of the way on this issue?

Don't bother sending e-mail to Gov. Voinovich. He doesn't use it. Send your comments to me. I'll copy them and send them directly to the governor, the National Governors' Association executive director and Congress.

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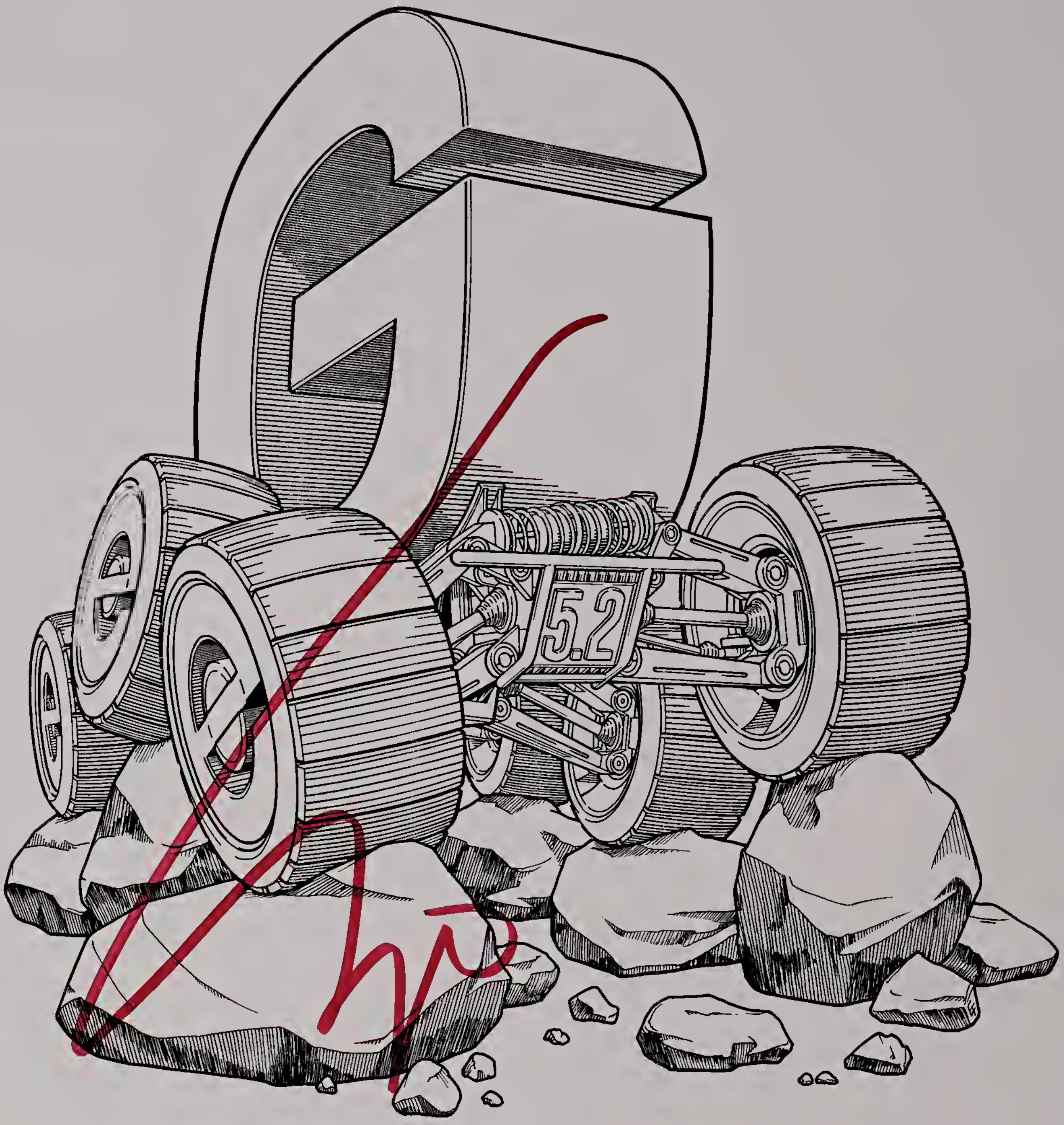

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Trendlines

NEWS, INSIGHT, HUMOR, REVIEWS

Edited by Sara Shay

From the Mouths (and Crayons) of Babes

IMAGES Kids at Pine Hill School in Sherborn, Mass., recently were asked to describe and draw their visions of a computer professional. Here we present a few of the most insightful comments and inspiring portraits. (For more, visit *www.cio.com/CIO/011398_kids.html.)*

- Can be a he or a she
- Wears a white coat
- Knows how to spell
- Goes on a computer a lot
- Wears a name tag
- Might have spiked hair
- Some wear glasses
- Does not wear funny clothes
- Knows what to do
- Doesn't have to be just a white person
- Doesn't use bad language
- Doesn't wear a bathing suit
- Might have blue eyes
- Likes computers
- Wears blue pants
- Wears a tuxedo
- Friendly
- Has hair
- Smart ■

Where's the Fun in Funding?

ILLUSTRATION BELOW BY GEORGE SCHILL

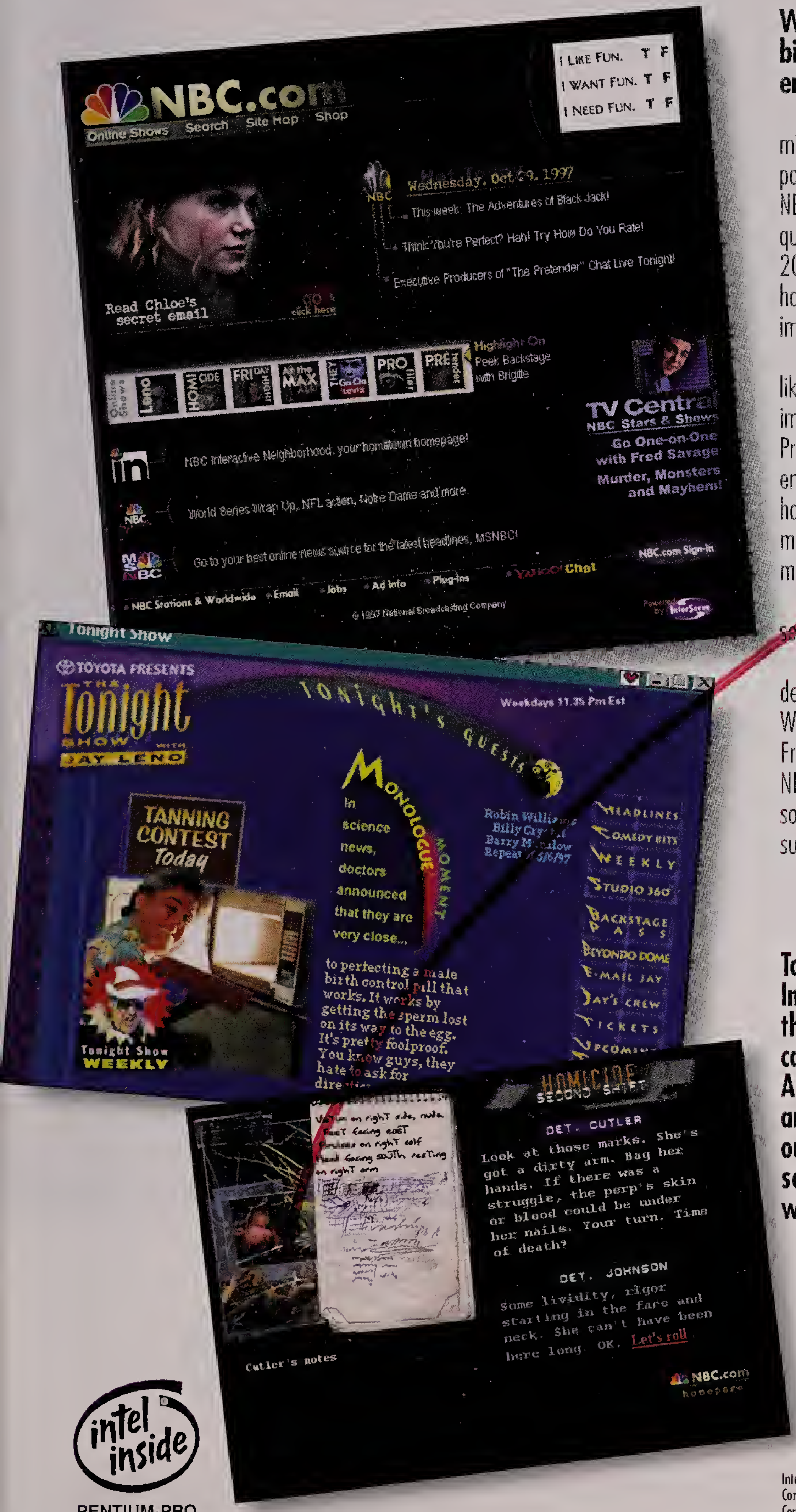
BUREAUCRACY In the rush to wire America's schools to the Internet, the various entities that hold the splicers are approaching the job in some unique ways. In Bertie County, N.C., for example, the local high school holds a "Bucks for Bertie" deer hunt each fall to raise money for computers and networking equipment. For $300 apiece, hunters get to shoot for two and a half days with local landowners acting as guides.

Meanwhile, in Maine, the lawyers are handling the connections. To resolve a dispute over telephone fees charged to Maine residents in 1996, Maine's Public Utilities Commission agreed to let Bell Atlantic wire all the schools at an estimated cost of $20 million in exchange for an end to the legal wrangling. "The educated are getting richer, the uneducated are getting poorer. I want to be sure people in this state are in the former category, not the latter," crowed Maine governor Angus King, in a press conference announcing the wiring plans.

And in New York City, the backers of Mayor Giuliani's Project Smart Schools program buttonhole exhibitors at the PC Expo show each June and ask them (nicely) to leave all the high-tech display wares behind when they leave, according to Miller Freeman Inc., which produces PC Expo.

Such creativity is necessary when your alternative funding source is the Federal Communications Commission, which has lent its own brand of bureaucratic élan to the problem. The commission manages

The web goes primetime. NBC.com goes Intergraph.



Wednesday, Oct 29, 1997

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In science news, doctors announced that they are very close... to perfecting a male birth control pill that works. It works by getting the sperm lost on its way to the egg. It's pretty foolproof. You know guys, they hate to ask for dire...

Robin Williams
Billy Crystal
Barry Manilow
Repeat 5/6/97

Victim on right side, nude
Feet facing east
Bruises on right calf
Head facing south resting on right arm

Look at those marks. She's got a dirty arm. Bag her hands. If there was a struggle, the perp's skin or blood could be under her nails. Your turn. Time of death?

Some lividity, rigor starting in the face and neck. She can't have been here long. OK. Let's roll

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a $2.25 billion pool of funds, known as the Universal Service Fund, which is collected from long distance phone carriers (as mandated by the Telecommunications Act of 1996) to wire schools, libraries and rural health organizations. The FCC created two independent companies to administer the funds; one for schools and libraries and one for health organizations. The Schools and Libraries Corp.'s CEO, Ira Fishman, a former consultant to the FCC, draws a $200,000 annual salary, twice the average earnings of an FCC commissioner. In 1997, Fishman and his staff began working on a series of forms for schools to fill out to receive money. Unfortunately, according to a November 1997 letter from Fishman, the company couldn't put up its Web site giving schools access to the forms until mid-January 1998, two weeks after the disbursements were supposed to begin. And schools must wait 28 days after requesting services and equipment via the site before they can expect any money.

House Commerce Committee Chairman U.S. Rep. Tom Bliley (R-Va.), seized upon a rare opportunity to play the political hero when, in a letter to FCC Chairman William Kennard last November, he asked whether the FCC had considered "less bureaucratic" methods of administering the funds. Ummm, naaah.

–Christopher Koch

Wired Schools

You Do the Math

Percentage of U.S. public schools with computers for students	**98**
Percentage of classrooms that have computers	**14**
Percentage of schools with Internet access	**64**
Percentage of schools that use individual dial-up connections to access the Internet	**74**
Number of students per computer in schools with less than 25 percent minority enrollment	**10**
Number of students per computer in schools with more than 90 percent minority enrollment	**18**
Cost to connect a classroom with networked computers over a school LAN at a 5-to-1 student to computer ratio by 2000	**$555,000** initially, **$165,000** per year ongoing
Percentage of average total K-12 school budget represented by these costs	**3.9**

SOURCES: EDUCATIONAL TESTING SERVICE, QUALITY EDUCATION DATA, MCKINSEY & CO., NATIONAL CENTER FOR EDUCATION STATISTICS. NUMBERS APPLY TO U.S. PUBLIC SCHOOLS. DATA IS FOR 1996.

Hit the Road, Sans Jack

ILLUSTRATION BY ROB DUNLAVEY

E-MAIL RETRIEVAL Not having access to e-mail while you're on the road can be like having your umbilical cord to the office severed. But how do you check your messages when you're traveling without a laptop or your laptop's battery dies before you can log into your account?

A new telephone service from e-Now of Ojai, Calif., can help you reconnect with your office lifeline when you're unable to log on to the Net. E-Now's system accesses your Internet account when you call a toll-free number, and a computerized voice reads e-mail aloud to you over the phone.

Here's how it works: Customers who sign up for the service give e-Now their e-mail log-in names and passwords. This information is housed on e-Now's secure server. When customers call in, e-Now's proprietary software automatically accesses their Internet accounts and reads messages aloud. To prevent unauthorized access to accounts, customers key in a personal identification number each time they want to hear their messages. For $12 a month, users get 20 minutes of access time on e-Now. Each additional minute costs 15 cents. E-Now will also fax your e-mail to you for $2 a message in the United States or $4 overseas.

Of course, just listening to e-mail messages isn't enough when you need to reschedule a crucial meeting from afar. So e-Now lets you dictate responses to messages to a live operator who will forward an e-mail reply for you. And at $2 a pop, paying per response could end up being cheaper than calling the office and appointing an underling to do the job. For more information, call 888 432-7366 or visit *www.e-now.com.* ■

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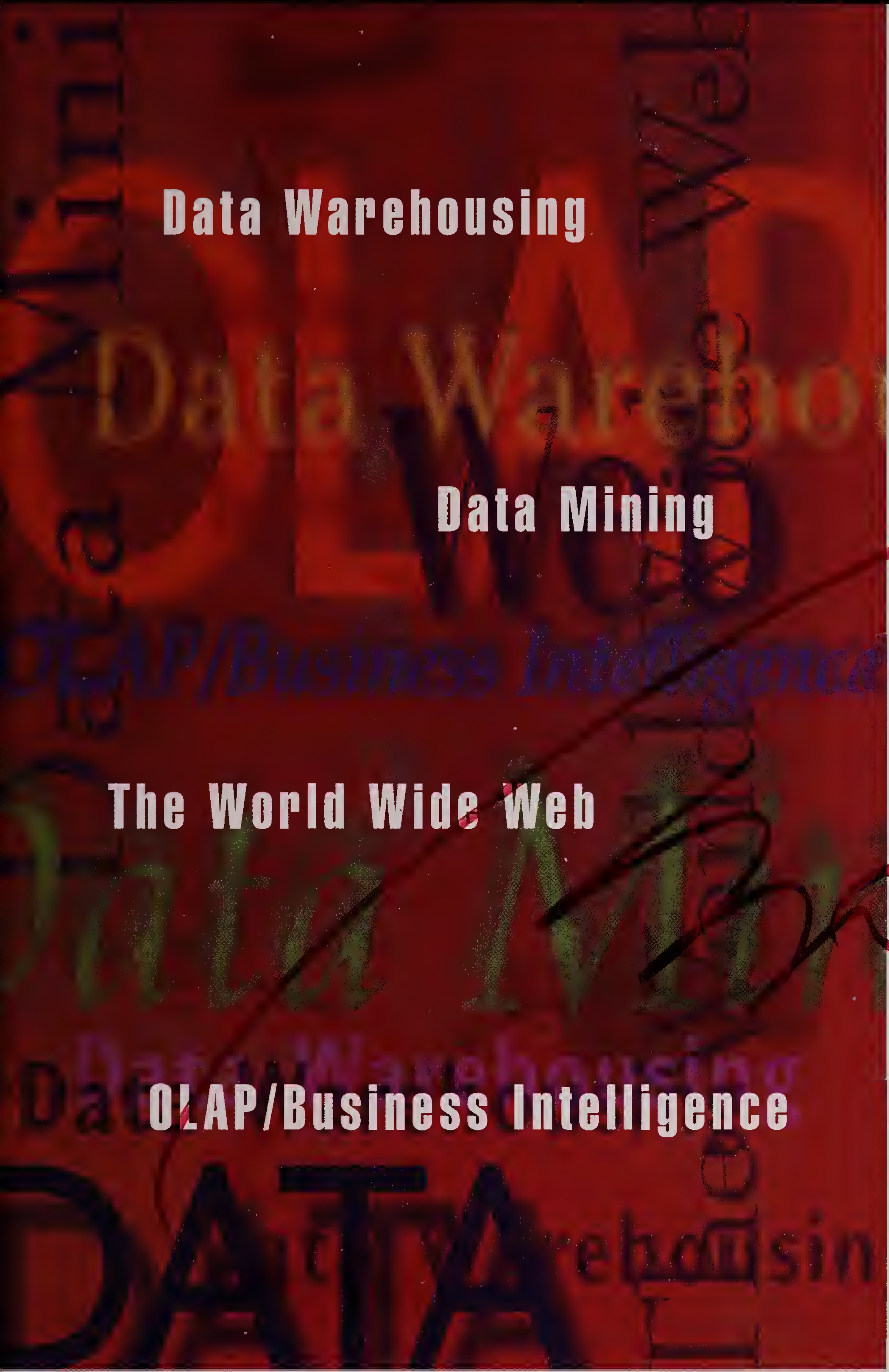

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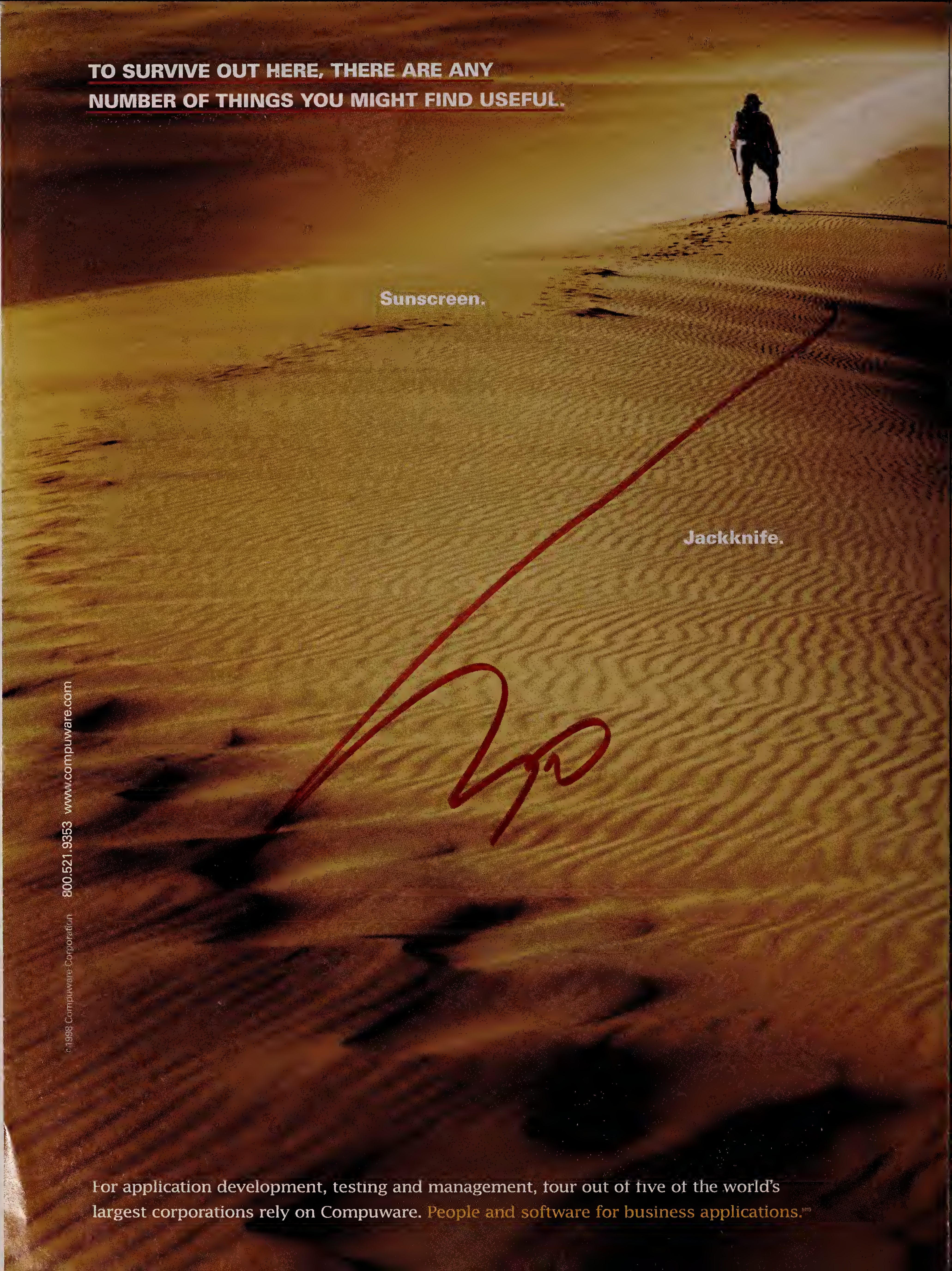

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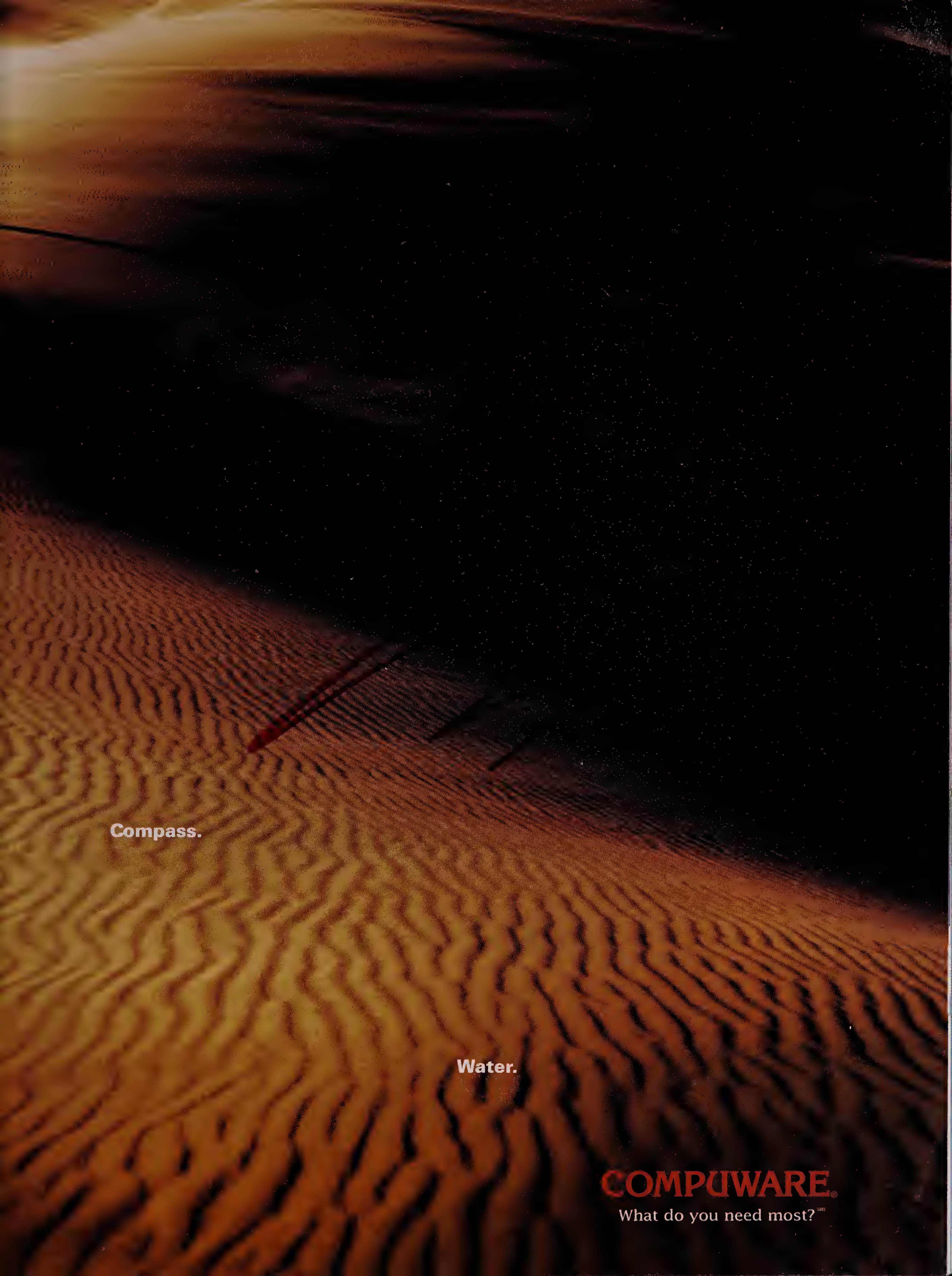
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Trendlines

No Place Like Home

VIRTUAL HOSPITAL Hate hospitals? Then you might find a recent advance in telemedicine a novel alternative to pea-green walls and that vaguely disturbing hospital smell. Last year, Sabratek Corp. of Niles, Ill., introduced MediView, which makes it easier for patients to stay out of the hospital and still receive personalized treatment.

MediView, a combination of custom software, telecommunications and remotely controllable medical devices, can control, monitor and download dosage information to infusion devices that control intravenous drips and deliver medication. Say it's the middle of the night, and a homebound patient isn't feeling the benefit of the drip. With MediView's telemedicine communications software, she can link the infusion device to the hospital's computer via her home phone line and change the dosage from her bedside within parameters preset by her physician. The next morning, her doctor can download the information of the dosage change via MediView. MediView also enables physicians or nurses to remotely program dosages to be dispensed by the infusion devices located in

ILLUSTRATION BY GEORGE SCHILL

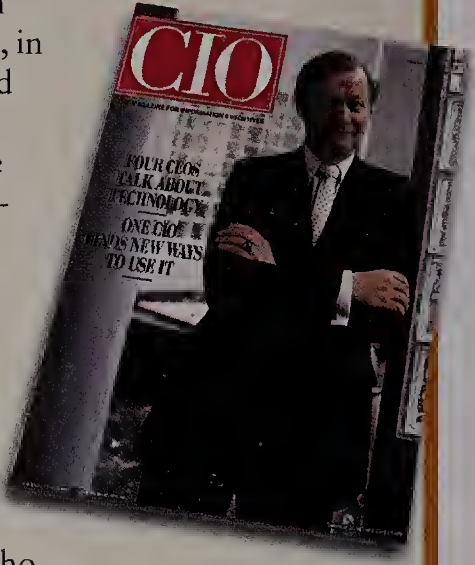
FLASHBACK

10

Years Ago In *CIO*

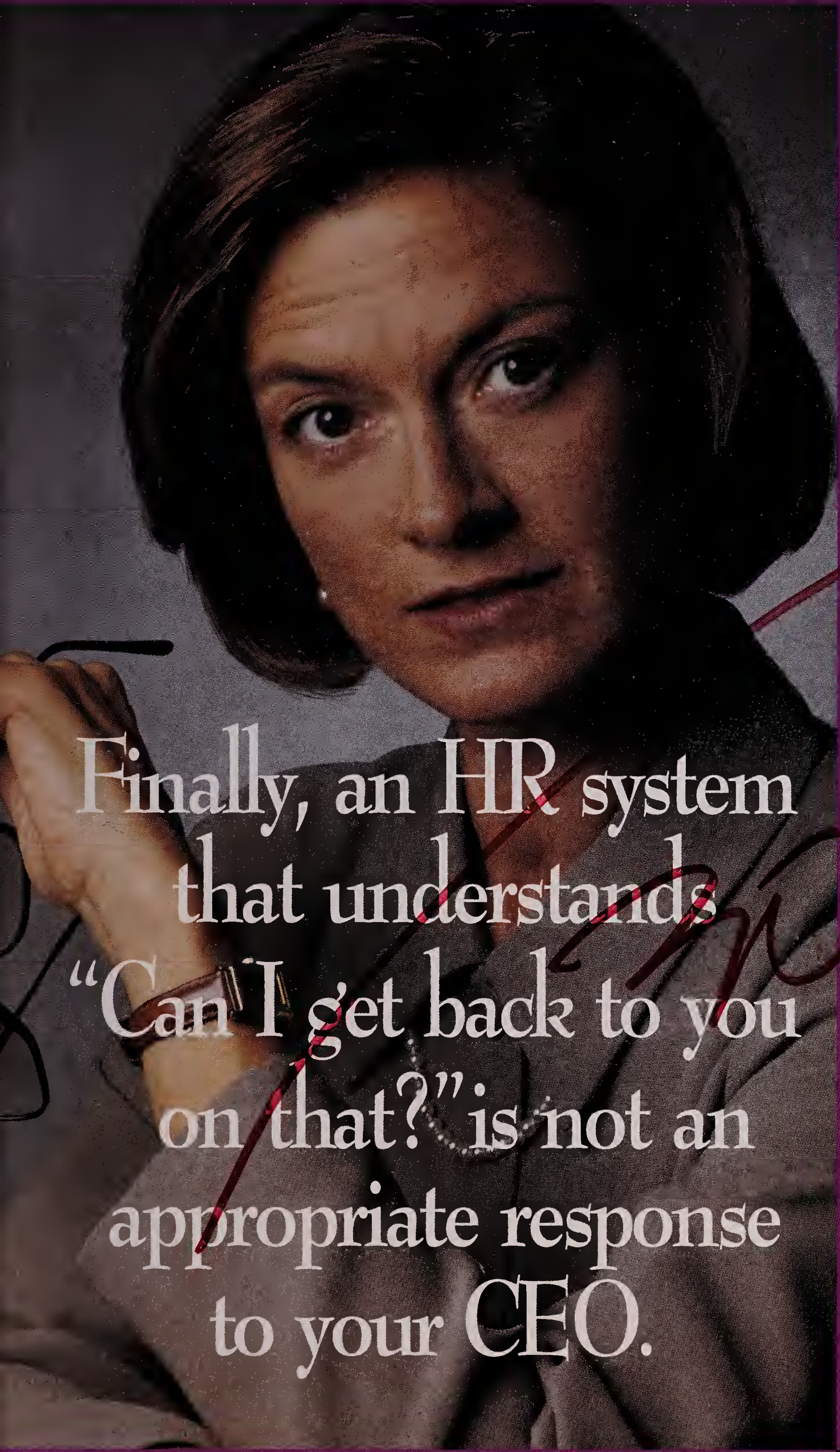
March 1988

Now that one mouse click can take you from a PC in Paris, Texas, to a server in Paris, France, the job of an international CIO has changed considerably. Just flash back 10 years to the March 1988 issue of *CIO*, in which Howard Anderson, founder and managing director of The Yankee Group, based in Boston, explained the differences between the job of an international CIO and one working in the United States. Take, for example, the support for X.400, a set of international message-handling standards that a decade ago was drawing attention in Europe but which Anderson says was considered ho-hum in the United States. Back then, Anderson advised smart CIOs who wanted to be strong overseas to "begin to incorporate X.400 compatibility into their purchasing plans starting next year." But today, Anderson says, unwieldy X.400 is basically on life support. Smart CIOs both here and abroad are instead placing their bets on intranets and making plans to switch to Internet-based e-mail systems within the next two years. "The Internet changes everything," Anderson says. Companies—especially multinational ones—should use Internet technology internally and externally, Anderson says, because Internet standards "automatically build interoperability between the multiple platforms every international CIO must live with."


CIO
FOUR CEOS TALK ABOUT TECHNOLOGY
ONE CIO FINDS NEW WAYS TO USE IT

More than technology has gained power in the last decade. The international CIO has, too. Ten years ago, Anderson says, there was no such thing as a truly international CIO—there were only CIOs who had dotted-line connections to their companies' foreign operations. That meant European IS staffers with an American company would often march to their own tune, Anderson says, "just because they didn't want corporate telling them what to do." Today, companies realize that if they are going to have a global presence, they need a global CIO who has real power. Even so, unlike a U.S.-only CIO, an international CIO may still not have direct control over his or her entire budget. He or she may hold the purse strings in the United States and Europe but have only advisory control in less technologically advanced countries in Latin America and the Far East, for example. To keep the overseas troops in step with their counterparts in the United States, an international CIO must be a bit of a visionary, a bit of an architect and a bit of a coach. Anderson advises CIOs to scan the landscape for the best technology; for the next decade, Internet-based technology is a safe bet. Then make it easier for overseas IS shops to convert from proprietary systems to Internet-based ones. Offer to do the research, secure volume pricing and help with support. And then, Anderson says, tell them that if they still want to go off and do their "own damn foolish thing, good luck." *–Sari Kalin*

HR MANAGEMENT SYSTEMS



Finally, an HR system that understands "Can I get back to you on that?" is not an appropriate response to your CEO.

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But the prognosis for this contribution to telemedicine isn't completely favorable. As of this writing, Sabratek was being challenged in the courts by rival Deltec Inc. of St. Paul, Minn., which claims MediView infringes on its technology patents. It may still be awhile before the hospital-wary can rest easy. ■

CORRECTION In our Dec. 15, 1997/Jan. 1, 1998, special issue on the IS staffing crisis, we mistakenly deleted part of a sentence in the article "Desperate Times, Creative Measures." The paragraph in the second column of Page 64 should have read as follows: "About 70 HR managers at a September conference sponsored by Little Falls, N.J.-based International Quality & Productivity Center expressed hunger for any strategy, including the offbeat, that could solve their IS staffing crises."

The deletion made IQPC appear to be suffering from a staffing crisis; in reality, the company sponsors conferences on such matters. The IQPC event mentioned yielded several useful sources and information for our special issue. We regret the error. ■

Findings **Manufacturing and IT**

Progress for Makers of Consumer Goods

American manufacturers of consumer goods, which make up one of the largest sectors of our economy, are outpacing their counterparts in the rest of the world in revenues and profits, thanks in no small part to IT. That's the word from the Computer Sciences Corp. and *Consumer Goods Manufacturer* magazine, whose recent study, "Integrating the Business for Growth," looked at technology management and application trends in four consumer-goods segments—fashion, specialty, food and beverage, and nonfood packaged goods. Respondents in this second-annual survey were 122 IT executives in U.S. companies whose annual revenues ranged from less than $100 million to $1 billion or more. Participants represented a wide cross-section of the manufacturing arena, from companies manufacturing globally recognized brands to small shops producing specialty items.

The study showed that consumer-goods manufacturers increasingly are calling on IT to increase productivity and improve efficiency by integrating disparate functions and business processes. But it also found that a significant number of the companies surveyed are struggling to prepare their systems for the millennial date change—31 percent of respondents are still assessing the situation and only 28 percent are deploying year 2000-compliant systems (33 percent are renovating legacy systems).

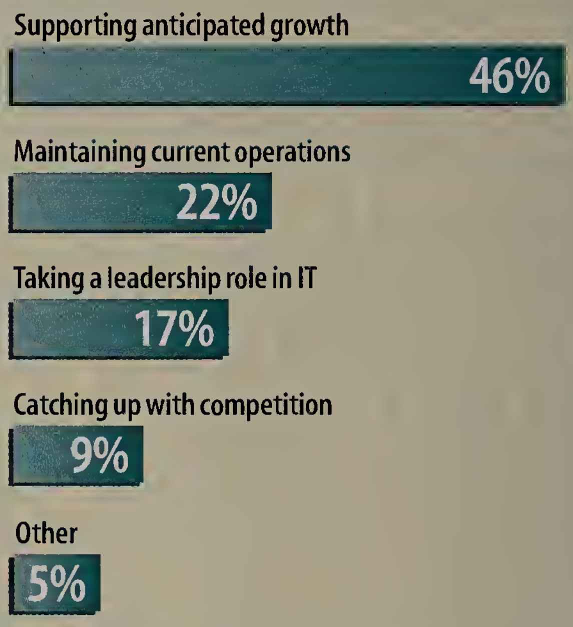
Other highlights from the study:

- Nearly three-quarters of the respondents cited pressure to reduce production costs as one of the most significant market forces facing their companies.
- Integrating systems remains the top IT concern, noted by 57 percent of the respondents.
- IT budgets are fairly strong: 45 percent of the respondents reported a budget increase in the last year and 34 percent expect their budgets to hold steady.
- Almost 40 percent are implementing enterprisewide systems, up from just 24 percent in 1996.
- Most respondents plan to adopt document/workflow management, executive information systems, imaging and interactive multimedia within the next three years.
- The top activities planned for technology application are activity-based costing, collaborative replenishment, promotion planning/measurement, performance measurement and capacity planning.
- The Internet has taken on increased importance in the last year: The number of respondents noting the existence of a corporate Web site rose from 33 percent last year to 62 percent, although very few companies are using the Web for electronic commerce.

–David Pearson

Why They Buy

Percent of 122 IT executives who cite the following as the primary purpose of their IT investments:



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MAKING THE MOST OF AN INFORMATION-RICH ENVIRONMENT

Cheap Is Beautiful

Are we using "appropriate technology" where we need it, or is the productivity paradox being fueled by Pentium envy?

I'M SITTING ON AN AMERICAN Airlines plane as I write, reflecting on a process that left me panting and perspiring. I boarded the wrong plane to New York (I guess business at American is good, with two planes from Love Field, home of the Dallas/Fort Worth Airport to New York's Fiorello La Guardia Airport within 15 minutes). Despite all those jazzy (and surely expensive) automated boarding-pass readers at American's gates, I was admitted to the wrong plane and took "my" seat. When someone else claimed it, I confidently defended my turf, trusting that the IT prowess of American wouldn't let me down. Then I looked at the flight number—the boarding pass reader must have been dyslexic today.

Contrast this tale of high-tech betrayal with my experiences at another Texas-based airline, Southwest Airlines. At Herb Kelleher's airline you board the plane by handing the gate attendant a cheap (but somehow curiously satisfying) colored and numbered plastic card that's given to you when you check in at the gate. After each group of 30 passengers boards, the attendant shuffles through the cards and makes sure all 30 numbers are there. If you don't have the right color, you don't get on the plane at all. In several years of flying Southwest I have never seen flight attendants nervously counting passengers to determine why there are more or fewer empty seats than the computer predicted—a fiasco I frequently see not just on American but also on all the other higher-tech airlines.

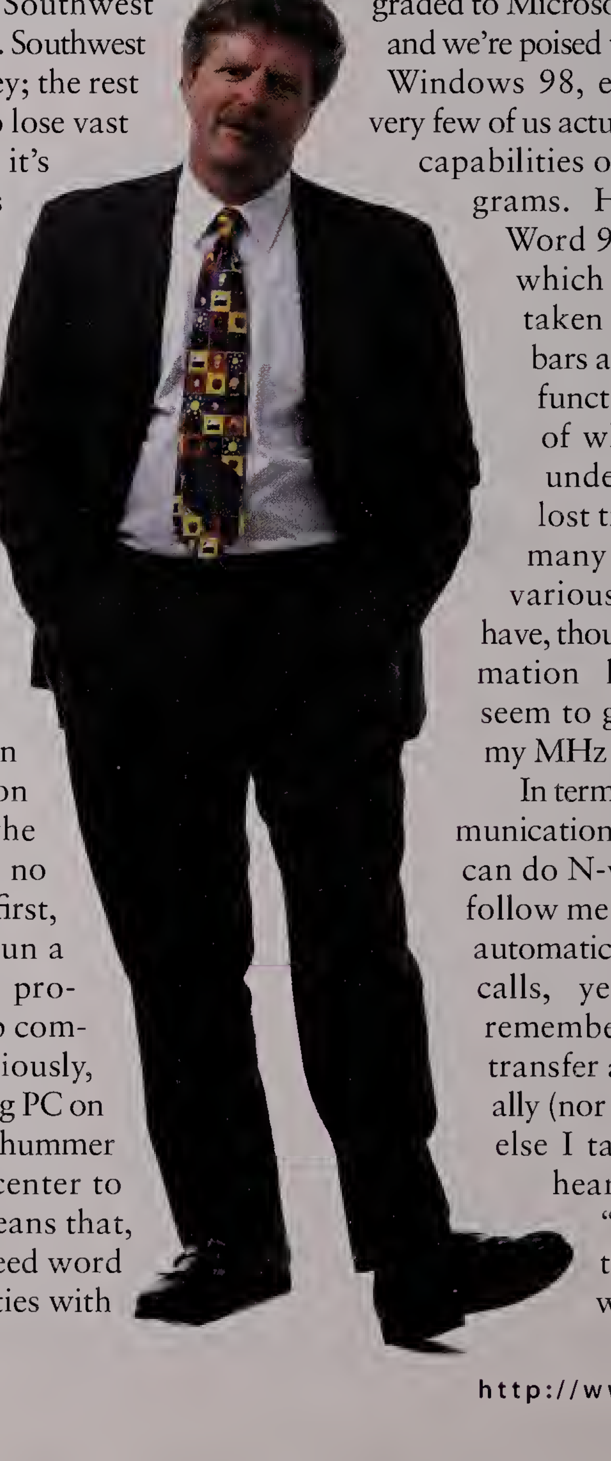
There's another perhaps related difference between Southwest and the other carriers. Southwest always makes money; the rest have been known to lose vast amounts. Maybe it's because Southwest's peanuts are cheaper, but I suspect its financial success has something to do with the use of appropriate technology.

Appropriate technology. The words are seldom seen together. The phrase means using the right amount and sophistication level of information technology to get the job done. No more, no less. It means that, first, when we need to run a complex software program that chews up computing cycles voraciously, we've got a screaming PC on the desktop or a big hummer S/390 in the data center to run it on. It also means that, second, when we need word processing capabilities with cut-and-paste and word count functions we run Microsoft Word 2.0 or Works on, say, an AT-class PC.

Did you have more trouble digesting the second option than the first? As a society, we are typically much more comfortable dealing with the high end of appropriate than the low end.

The evidence is everywhere. We spend half of our business capital on information technology. In the Nov. 18, 1997, edition of *The New York Times*, a study by the American Electronics Association and NASDAQ declared IT the biggest industry in the United States, with $866 billion in annual revenues (and I'd argue that's a conservative figure). We just upgraded to Microsoft Office 97, and we're poised to upgrade to Windows 98, even though very few of us actually need the capabilities of those programs. Half of the Word 97 screen on which I write is taken up by toolbars and icons, the functions of most of which I don't understand. I've lost track of how many MHz my various Pentiums have, though my information life doesn't seem to get better as my MHz increase.

In terms of telecommunications, my phone can do N-way calling, follow me around and automatically forward calls, yet I hardly remember how to transfer a call manually (nor does anyone else I talk to—ever hear the phrase, "Just in case this doesn't work, here's



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the number I'm transferring you to"?). In short, we've taken an OD of IT. I will spare you the dismal details on the productivity and profitability returns on these investments, but people who have spent much more time than I looking for such payoffs (e.g., Paul Strassmann, author of *The Squandered Computer*) haven't been able to find them.

New and Improved

Many people are mystified by the "productivity paradox"; it seems obvious that computers improve productivity. I agree that most of the time they do, but that's not the real question. What really matters is not whether any computerized capability improves your work but rather whether an incremental investment in IT does. Sure, you wouldn't want to toss your PC, your accounts payable system and your customer database—but can you really justify "improving" these things in economic terms? PCs may be the telephones of the '90s—standard issue to every information and knowledge worker—but we don't replace our telephones every couple of years. After the first big bite of computerization, the subsequent upgrades, new releases and added functions are just icing on the economic cake. They may, in other words, be inappropriate technology for the task at hand.

Appropriate technology. The words are seldom seen together. The phrase means using the right amount of knowledge and sophistication level of information technology to get the job done.

Powerful forces are arrayed against anyone who tries to argue for appropriate technology, or so it seems. Bill Gates and Andy Grove would like us to use highly inappropriate technology, and they would like to upgrade it often. PCs have become status symbols, and Pentium envy is pervasive. A hot box on the desk or in the briefcase has become another HR perk in a tough labor market. Our press, along with our general culture, glorifies IT and fills the heads of every airline magazine reader with visions of technological utopia. Anyone who argues for stopping this madness is labeled a Luddite.

Information Tools

There are a few heroic resisters. My favorite is Will Pape, who was the CIO (and by most accounts, the number-two executive) at VeriFone Inc., the leading provider of transaction automation (read, "card swipe") devices. Pape is just a part-time adviser to the CEO of VeriFone now, and the company has been acquired by Hewlett-Packard Co.—a great company, but one that has a certain interest in promoting inappropriate technology.

In its prime, however, VeriFone had the best information environment of any company I'd ever heard of, and the worst, or more aptly the most appropriate, technology environment. Managers and employees were generally extremely well-informed about what was happening in the business, thanks in no small part to Pape's daily "flash report" on company matters that was e-mailed broadly throughout the company. (Imagine that: a CIO who actually dispenses information.) The company identified over a hundred "information tools" for meeting common information needs.

But VeriFoners received that excellent information over such powerful technologies as 286 and 386 PCs, dumb terminals and VAXMail. (I'm not sure how old this e-mail technology is, but I started using it in 1978.) If you were designing complex circuits and needed a powerful workstation, you got one. But as Pape has long noted, "You don't need a Ferrari to drive to the grocery store." I have tried to convince my wife otherwise, but I suspect he is right. The IT equivalent is that you don't need a 300 MHz Pentium II to use word processing, spreadsheets and e-mail. And like Southwest, VeriFone made money and grew rapidly. Its IT costs were half the average for its industry. Pape and other internal VeriFone stockholders may have banged on obsolete keyboards, but when HP paid $1.29 billion for the company their pain and embarrassment was surely eased.

What really matters is not whether any computerized capability improves your work but rather whether an incremental investment in IT does.

Doing More with Less

Unfortunately, most organizations don't have the courage or the desire to adopt a VeriFonian approach. What, then, are some less radical alternatives?

- One approach that requires only discipline is to steadfastly resist upgrading unless it's absolutely, positively essential. For example, Dave Clarke, the CIO of W.L. Gore and Associates Ltd., is waging a campaign against upgrades that don't advance the organization's strategic focus on product development innovation.
- Classify users as to the level of technology they need: power, moderate or whatever runs word processing. If applications are working, leave them alone.
- Build new functionality on top of existing capabilities. Nordstrom, for example, built a perfectly adequate cross-store inventory query system with e-mail as the underlying technology (called "mail-enabled" appropriate technology).
- Make everything as standard and common as possible; another reason Southwest Airlines makes money is that it flies and maintains only Boeing 737s.

There is little—make that no—evidence that spending more on IT leads to competitive advantage, higher profits, shareholder value and so on. If you find that your company can do more or less what it does today with less expensive technology, you have discovered a quick route to economic value. Having the latest, most sophisticated technology is cool, but in business we generally consider making money even cooler.

Thomas H. Davenport is a professor and director of the Information Management Program at the University of Texas at Austin. He welcomes reader comments at davenport@mail.utexas.edu.

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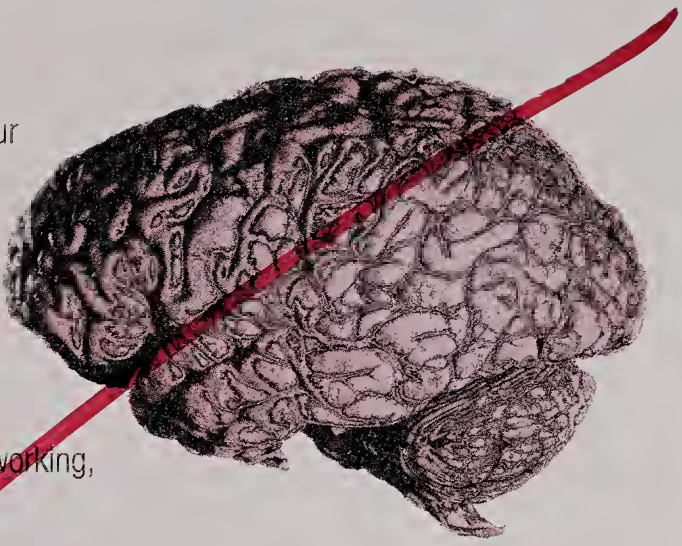

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Stitching APPLICATI

Combining legacy data and modern access methods doesn't have to be like surgery. With an integration team, it can be downright painless—for you and your budget.

BY CHRISTOPHER KOCH

If Ken Krueger and his band of systems integrators received royalties each time their computer application is used at telecommunications giant MCI, they would all be rich by now. The application, dubbed Registry, allows the exchange of information from one computer system into terms that other systems can understand and also acts as an application integration link to all the major information repositories at MCI. Add up all the times that "Yesterday" has echoed through elevators around the world and you would not even come close to Registry's repeat rate. Registry links 120 different MCI business applications and passes 40 million to 60 million messages between those applications each week. Paul McCartney, eat your heart out.

PHOTO BY WALTER CALAHAN

William "Buddy" Gillespie's integration strategy helps York Health System operate more efficiently.

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HAVING AN IN-HOUSE TEAM TO TACKLE middleware issues can kick-start any integration challenge. Companies that have organized such SWAT teams have discovered advantages in both speed and efficiency. Readers of this article will learn

- When an integration team becomes crucial
- How to change integration from a stumbling block to an advantage
- Why the services of an integration team might not be welcomed by other staffers and how to overcome those objections

When he talks about Registry, Krueger sounds like one of those bitter old bluesmen whose beats and licks were appropriated by the likes of McCartney and Elvis Presley. "I gotta start selling this thing," he mutters.

MCI's Ken Krueger and Steve Berscheid tackle the ugliest part of client/server integration.

So if he wrote it, why doesn't he sell it? Indeed, Krueger, senior manager of middleware development and support at MCI Communications Corp. in Colorado Springs, Colo., is trying to get MCI to market Registry outside the company, but he knows that the computer code is only part of the solution. Registry would not be what it is without the diverse band of developers, consultants and support people. It's they who update the code, provide support to application developers around the company who want to incorporate Registry, and sell the concept to those who are either unfamiliar with it or reluctant to use it. Krueger and his team form the in-house integration band at MCI. Theirs is an act whose popularity shows no signs of waning after five years.

Part of that popularity stems from the unglamorous nature of their work. Gluing together applications that were never meant to talk to each other is complex, time-consuming and unrewarding. If something changes in one of the applications, you have to pull the glue apart and start all over again. People at MCI embrace Registry for the same reason most of us buy CDs instead of guitars: You can spend years learning how to do it yourself, or you can let an expert do it for you. "[We] take the ugliest piece of client/server—integration—and put it in a place where people understand the problems and are experts in monitoring and fixing them," says Steve Berscheid, who leads Registry's support team.

A Cacophony of Applications

Companies that don't have a Registry-style integration SWAT team are paying a premium—anywhere from $25,000 to $100,000 a pop, according to Gartner Group Inc. estimates—to extract the critical information from one specific application for use by another specific application around the company. That's assuming, of course, that you know what you are doing when you crack the hood on a 25-year-old legacy system. Often, mainframe legacy applications have no inherent information-sharing capabilities whatsoever. In desperation, systems integrators access the system by building elaborate software imposters that mimic a data entry clerk—right down to typing in a password and logging onto a terminal screen.

The pain and effort involved in getting old and new applications to share information are driving IT departments crazy. "This is what gets people—they can't figure out how to make these different applications communicate," says Roy Schulte, vice president for Gartner Group's System Software Architecture Service in Stamford, Conn. Companies cannot afford to get rid of old computer systems, nor can they get everything they need from packaged applications. The economics of building connections between these applications in a "one-off," (that is, used by only a single application) haphazard fashion have become untenable. Systems integration needs to become simple, quick and, most important, repeatable. Companies that have created an integration SWAT team—even if it is only a team of one—are reaping tremendous rewards.

The demand for application integration is becoming intense: from customers who want to reach directly into old legacy applications through a Web browser, from suppliers and partners who want to yank information through an EDI connection, and from client/server database developers around the company trying to keep internal users well-fed with business information. These demands are beginning to overwhelm IT departments. In a study of 100 mission-critical applications among Fortune 1000 companies, the Standish Group found that 70 percent of the software code in these applications was devoted to communications and infrastructure—leaving just 30 percent to support the company's business processes. As businesses shed their home-grown applications and move to packaged software, in-house software developers are leaving and taking their integration skills with them. If IT is to avoid becoming completely dependent upon outside consultants and

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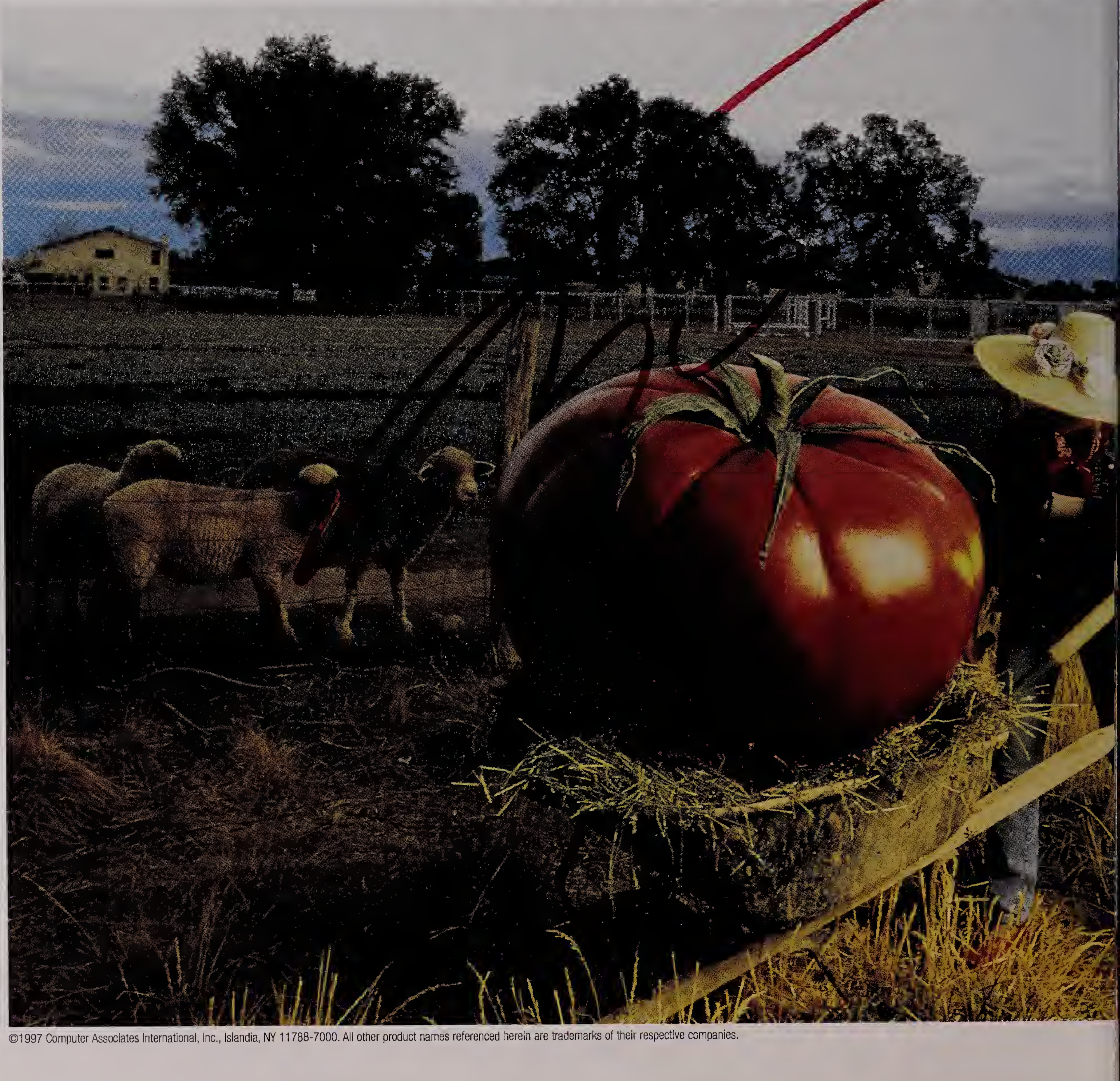

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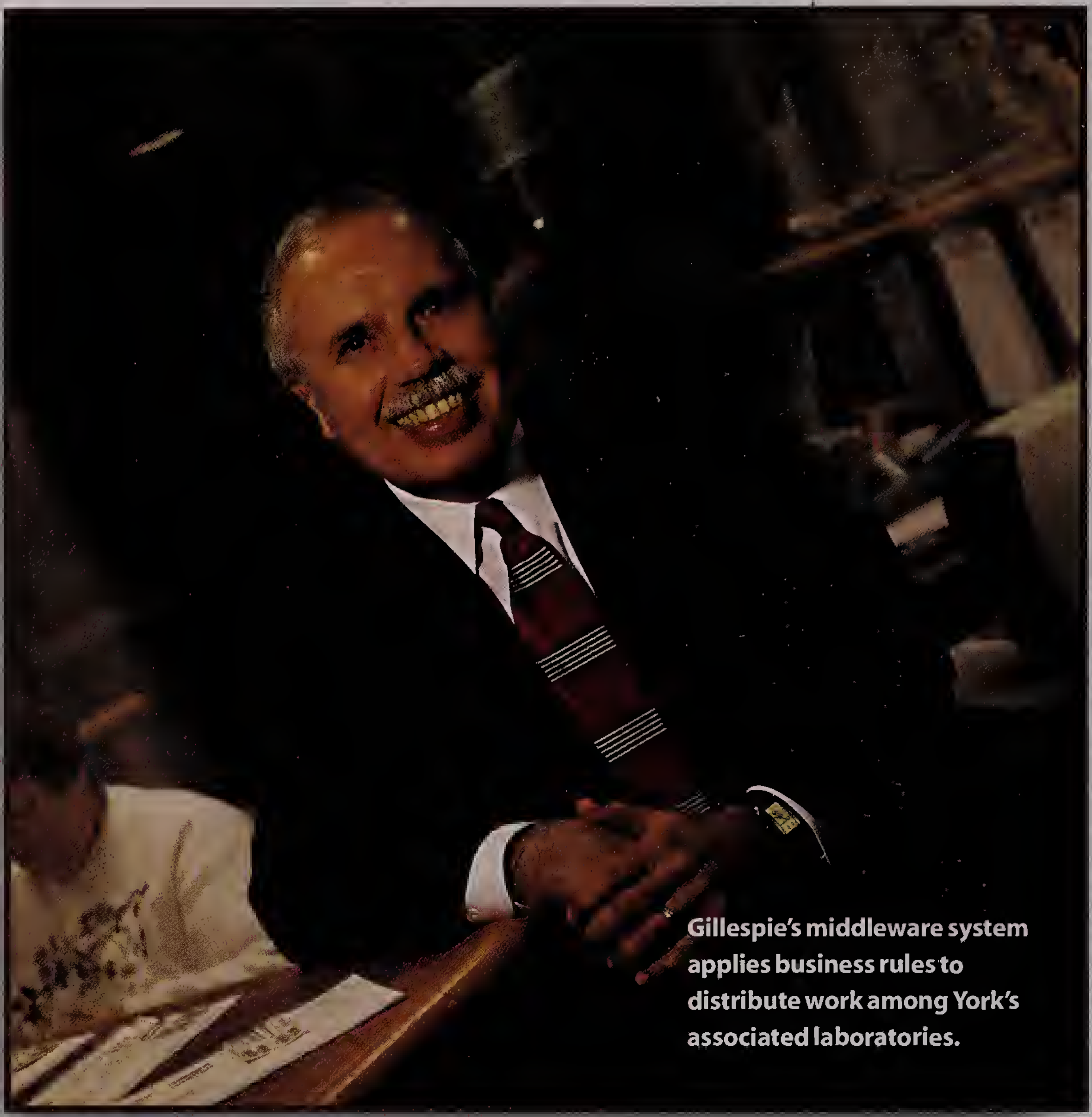
vendors, something has to give.

The give comes when the speed and quality of application integration begins to affect the core processes of the business. Integration-intensive industries like financial services and health care reached the brink years ago and decided to make integration a strategic skill rather than a constant strain. They developed independent messaging applications to broker information between incompatible systems. These "message brokers," as Schulte calls them, are often beefed up with business process logic so they can make decisions about where to route a message based on its contents. Schulte and other experts warn that with the rise of the Internet and electronic commerce, it's only a matter of time before the pain of integration becomes intolerable for any company without a plan. Gartner Group predicts that by next year, more than half of all companies will treat the management of critical interapplication interfaces as an independent discipline.



Gillespie's middleware system applies business rules to distribute work among York's associated laboratories.

PHOTO BY WALTER CALAHAN

IT departments that have embraced the SWAT team concept can respond to integration demands with 911-like speed and precision. Though the technologies and concepts behind a message broker strategy such as Registry may sound fancy, they are simply a new manifestation of basic technologies, says Mark Shary, president and CEO of middleware vendor HubLink. "This is not some phenomenal technology enlightenment," says Shary. "It's a common-sense response to an economic need."

I'm Dancing as Fast as I Can

The need usually starts small, says Shary. "A lot of times we see the driver for message brokers coming from a department, not the enterprise. Someone in one department starts screaming for data that's sitting on another department's system. As more departments start screaming, the economics of doing this with spit and bailing wire each time [become apparent]."

For York Health System in York, Pa., the screaming started back when it was known simply as York Hospital. Service contracts between the hospital and outside providers such as test laboratories required gathering patient information from many different application systems and locations. When the hospital decided to become an "integrated service provider" in the early 1990s by buying up local medical practices and developing a new laboratory alliance with other health-care providers in the area, the integration challenge grew considerably.

"We weren't just tying systems together inside our own company, but linking into a complex combination of owned entities," says William "Buddy" Gillespie, who became CIO in 1996, after the hospital had already installed a middleware system to deal with the problem. "A lot of our alliances are loosely coupled, so the middleware gives us the flexibility to build a bridge to organizations that may not have the same IT portfolio or communications technologies we do." In 1996, Gillespie successfully lobbied senior business management to begin extending York Hospital's message broker infrastructure across the expanded company.

The messaging system not only lets disparate applications talk to one another, it also makes business decisions based on the content of the messages it receives. For example, when a doctor in the York network submits a lab test request for a patient, the message broker, which is based on the HubLink product, decides which testing lab in the alliance will get the business by comparing information in the request to a set of business rules programmed into the message broker. These rules take into account a particular lab's capacity, prices and competence in the test being requested, along with a patient's health history and insurance coverage. The tests are performed more quickly, with more accurate results and lower cost than if the request had bounced back and forth between hospital administrators and various labs, says Gillespie.

Currently, Gillespie is working on cre-

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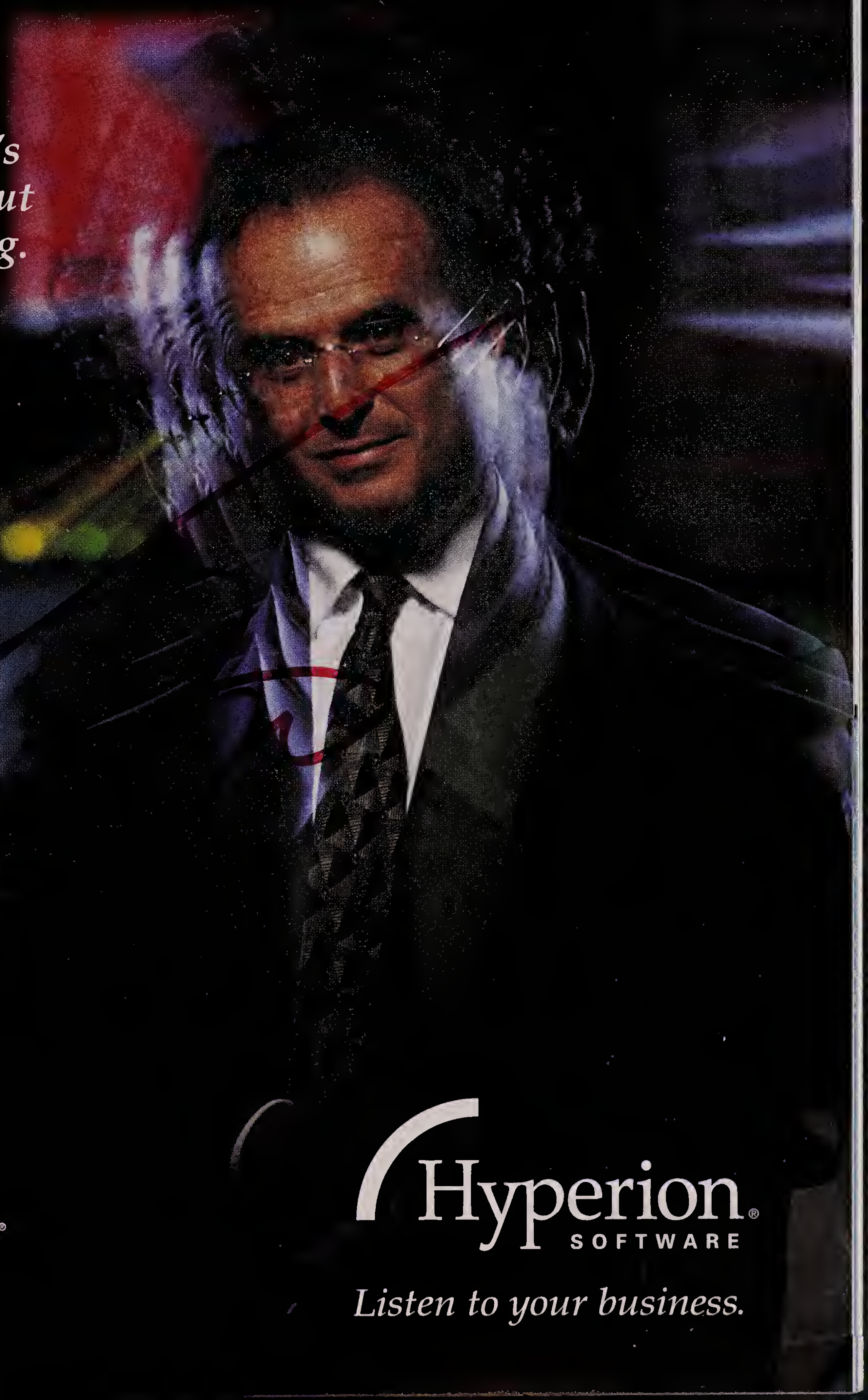

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ating a central directory that manages all patient information for the entire network. Even if a patient has never visited the hospital, the hospital will have the patient's information as long as he or she has visited one of the providers tied into the network.

By linking all the applications in York's system to a single, standard communications strategy, Gillespie reduces support costs for all those individual applications. "Once you create a message broker architecture, any additional application that needs to be integrated comes in relatively inexpensively," says Schulte. "You already have the low-level problem solved—you know how you will communicate between the different application systems." Once a message broker strategy is in place, integration costs drop to between $5,000 and $8,000 per application, estimates Shary. That's quite a drop from the $25,000 starting figure Gartner's research suggests.

Saving on Backup Players

The savings in support staff can also be dramatic, according to Krueger. "We used to have a bunch of different applications that all handled the same thing—accessing our customer repository [database]—in a slightly different way. That meant you needed to have support people for each different type of connection. Now we have a staff of 10 people who can service 100 different applications, because those applications all use [Registry]."

The Registry team takes pride in its ability to get new applications hooked into the system in a matter of hours. "When one of the application development organizations wants to build a new application using the same basic business logic contained within Registry, they don't even have an [integration] development cycle," says Clint Petty, president of Reston, Va.-based DCMS Inc., a consulting firm that helped MCI develop Registry. "All they have to do is design the application and the GUI and reuse the messages in Registry to access the data."

Quick integration turnaround times have dramatic implications for a company like MCI, whose products are built from creative combinations of existing information. For example, MCI developers created the MCI One calling plan product by combining information from many different independent products—cellular, long distance and Internet—together on a single bill using Registry. Because all the mainframe billing applications for these different services were developed independently of one another, Krueger estimates that traditional integration methods would have delayed introduction of the product three years. With Registry, the turnaround time was three months.

The Registry team has its own staff of 15 developers, who write updates to improve functionality (version 2.3 is due out soon) and support tools to help the 20-member support staff maintain Registry. There are also five Registry consultants, known as "front-runners," who sell the message broker concept inside the company. "Front-runners are high-level people who work with the customers who are developing major applications for use with Registry," says Krueger. "We found that the earlier we get in there, the fewer problems we get down the road in terms of integration and support."

Krueger would not say how much MCI pays for Registry and his staff. "We have no budget—this thing has evolved as being 'free,'" says Krueger. That means less trouble for Krueger when justifying his staff's size but more trouble in implementations. "We have become the de facto debuggers for MCI," he moans. "Every time something goes wrong in an application somewhere, the developers say, 'It must be Registry,' and call us in to prove that it isn't."

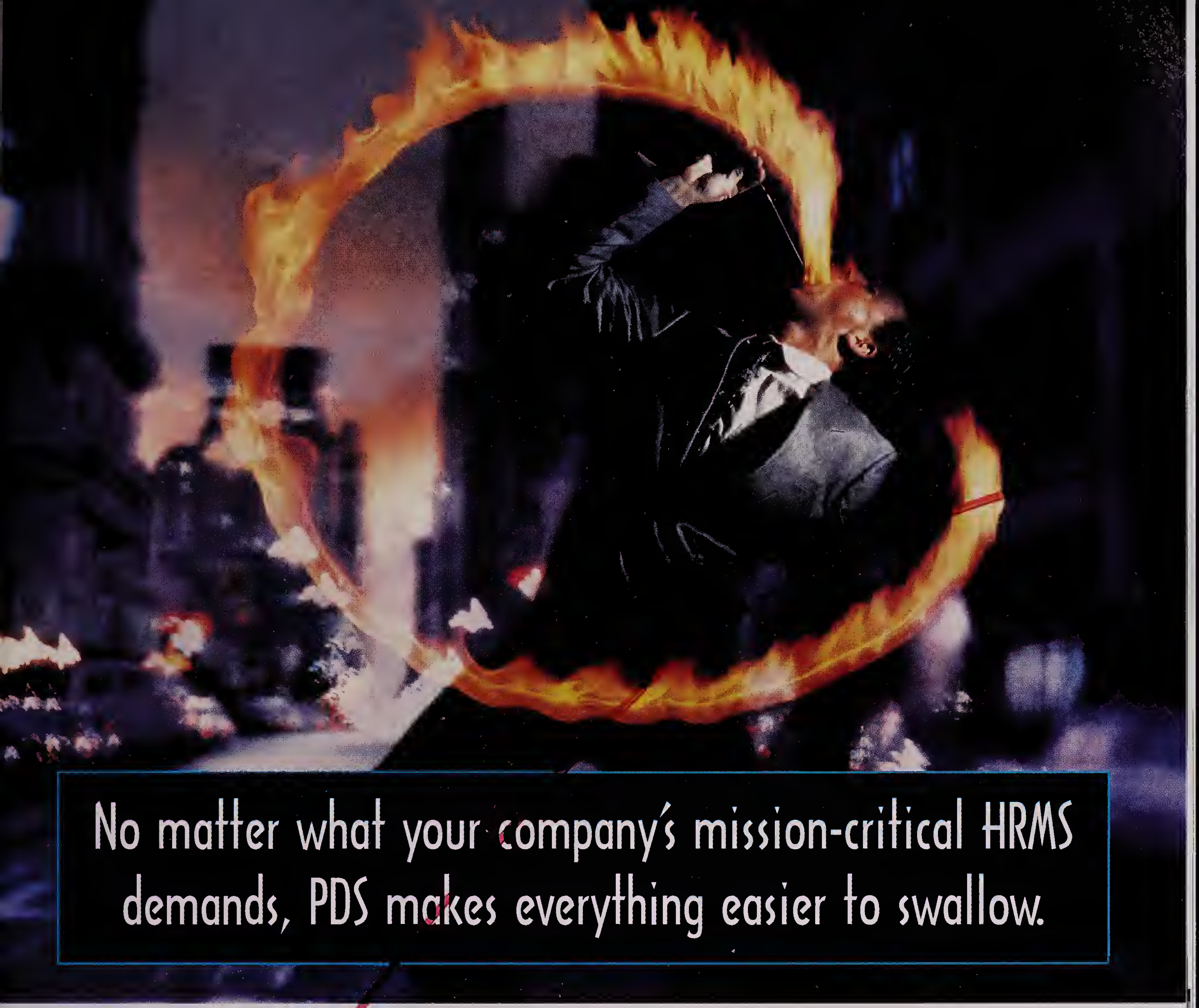
Dealing with Sour Notes

The diversity of the Registry team reflects the difficulty of its mission: to sell the concept as an enterprisewide integration solution. That's not easy in a company culture where technology is considered high art. The team encounters constant resistance from application developers and IT groups around the company who think they have better solutions to application integration. "MCI has problems with resistance because it is trying to do a strategic implementation across hundreds of applications," says Schulte. "Most companies are doing this tactically across fewer applications so there aren't as many big political issues."

But even in organizations where politics is an issue, the message broker strategy can win out if the payback is big enough. The state of Ohio has formed what it calls a data linkage technology committee, made up of IT directors from the major state agencies, to foster better information sharing. The committee uses a middleware link to connect the major agencies' jumble of different computer systems into a cohesive virtual network. For example, a case worker in Ohio's Department of Social Services can verify a welfare applicant's address by accessing the applicant's files in the Bureau of Motor Vehicles' systems, while also dipping into the Bureau of Employment's databases to see if the applicant has been working lately. All of these various computer systems were designed independently and had no capacity to communicate directly until the middleware link came along.

Real-time access to different state agencies' computer systems has reduced the rate of error in welfare applicants' wage information by 25 percent, which has translated to $15 million in savings, according to William Griffith, data link-

> **Once a message broker strategy is in place, integration costs drop to between $5,000 and $8,000 per application, according to some estimates.**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age project manager in the Department of Administrative Services for the state of Ohio. "The difference is that the case worker can verify the information while the applicant is sitting there," says Griffith, who is the state's one-man integration SWAT team but depends on highly specialized staff from each participating agency to solve integration problems. "In the past, case workers approved the benefits, and at the end of the quarter the agency would do a batch file transfer with other agencies and discover that the applicant was ineligible. It's difficult to recover that money [at that stage]—county prosecutors have bigger issues on their plates than recovering $400 from a lot of different households."

William Griffith is a one-man integration SWAT team for the state of Ohio.

Though Griffith is the only full-time staffer devoted to integrating the state's different computer systems, he counts innumerable county and state agency IT employees as honorary members of his integration team. Meanwhile, the data linkage technology committee handles the politics of information sharing at the higher levels.

Building to a Crescendo

The challenges of building and maintaining cross-functional support for a message broker solution across the organization argue against going for broke right away. "There's no such thing as installing a strategic, companywide message broker system from the start," says Schulte. "You must start tactically—connecting two high-need, high-yield applications together—and then expand it into something strategic. If it's not done incrementally, it's not going to work."

Incremental should not be confused with halfhearted, however. Even at York Health System, where the concept has full buy-in from top business executives, Gillespie has created a 6-person team (out of an 80-person IT staff) of integration specialists, called the Integrated Services Organization, to manage the message broker. "Their focus in life is planning the strategic and tactical uses of [message brokers] and the care and feeding of the middleware technology itself," says Gillespie.

The organization's members are application developers who "have a horizontal view across all the applications in the company and enough health-care background to understand how data should flow in a health-care environment," says Gillespie. He emphasizes the business knowledge over hotshot technical abilities. "Companies make the mistake of giving this [message broker] to the high-tech folks. You don't need those kinds of skills to manage this. The middleware is designed to take care of all the back office and communications stuff."

The integration team's mission is not to perform coding heroics, adds Schulte, but rather to help application developers around the company write the connections to the message broker themselves. "You need coaches rather than doers," he says. "That way, you'll need far fewer people." The coaching approach also defuses tensions between the integration team and the application developers. Integration teams that try to do all the coding between new applications and the message broker themselves will become unpopular real fast. "Don't try to disempower the application groups, otherwise they will fight you," Schulte warns. "If there is anything that needs to run on their computer or will affect their application, let them do it themselves with some coaching."

But before CIOs can begin worrying about the composition of the integration team, they need to figure out ways to shoehorn the message broker strategy in the company somewhere. That is the easiest part of the job, argues Schulte. "Most companies are facing this decision because they're buying packaged applications that need to hook into legacy systems," he says. "So they have to spend the money on integration anyway. Should they do direct integration between the two applications or should they use the opportunity to create a message broker that is extensible and reusable and will save them [time and money] the next time they want to add a new application?—well, duh." CIO

Senior Editor Christopher Koch can be reached at ckoch@cio.com.

PHOTO BY JOE HARRISON

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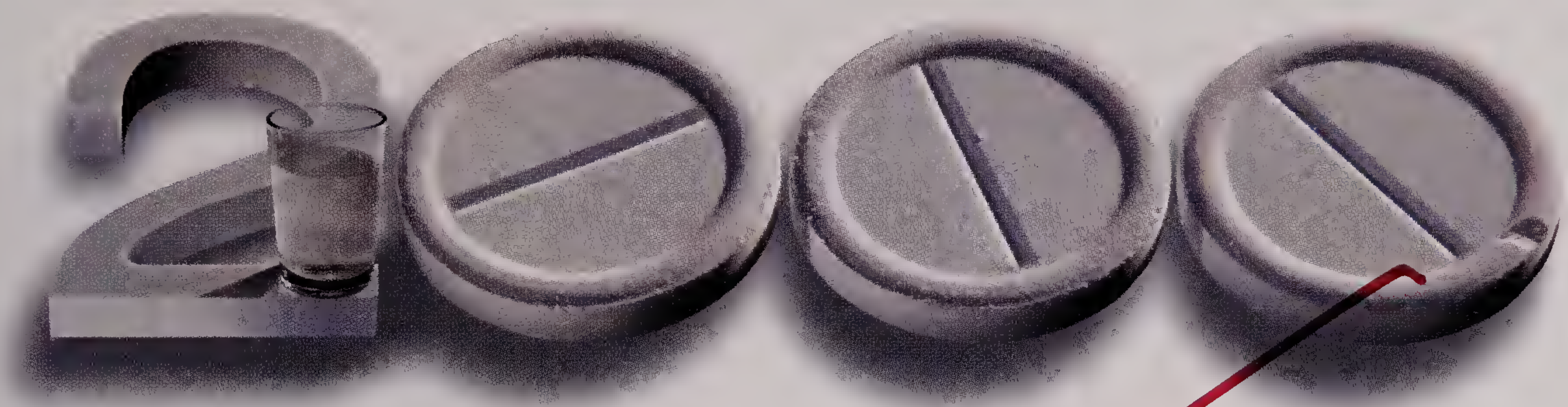

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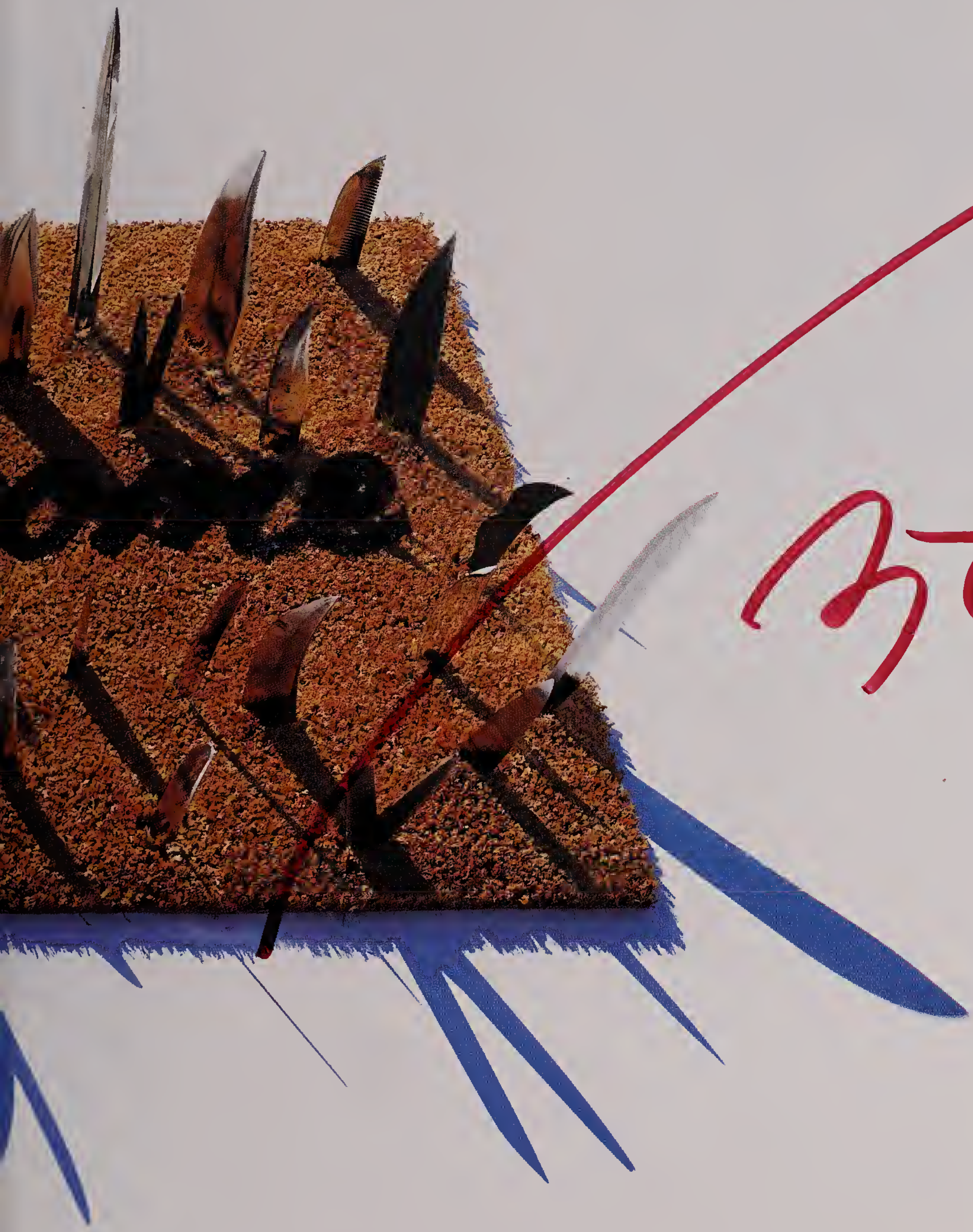

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Test Patterns

How are you going to be sure that your Y2K conversion works? First, test and document—then test and document some more.

BY SCOTT KIRSNER

Reader ROI

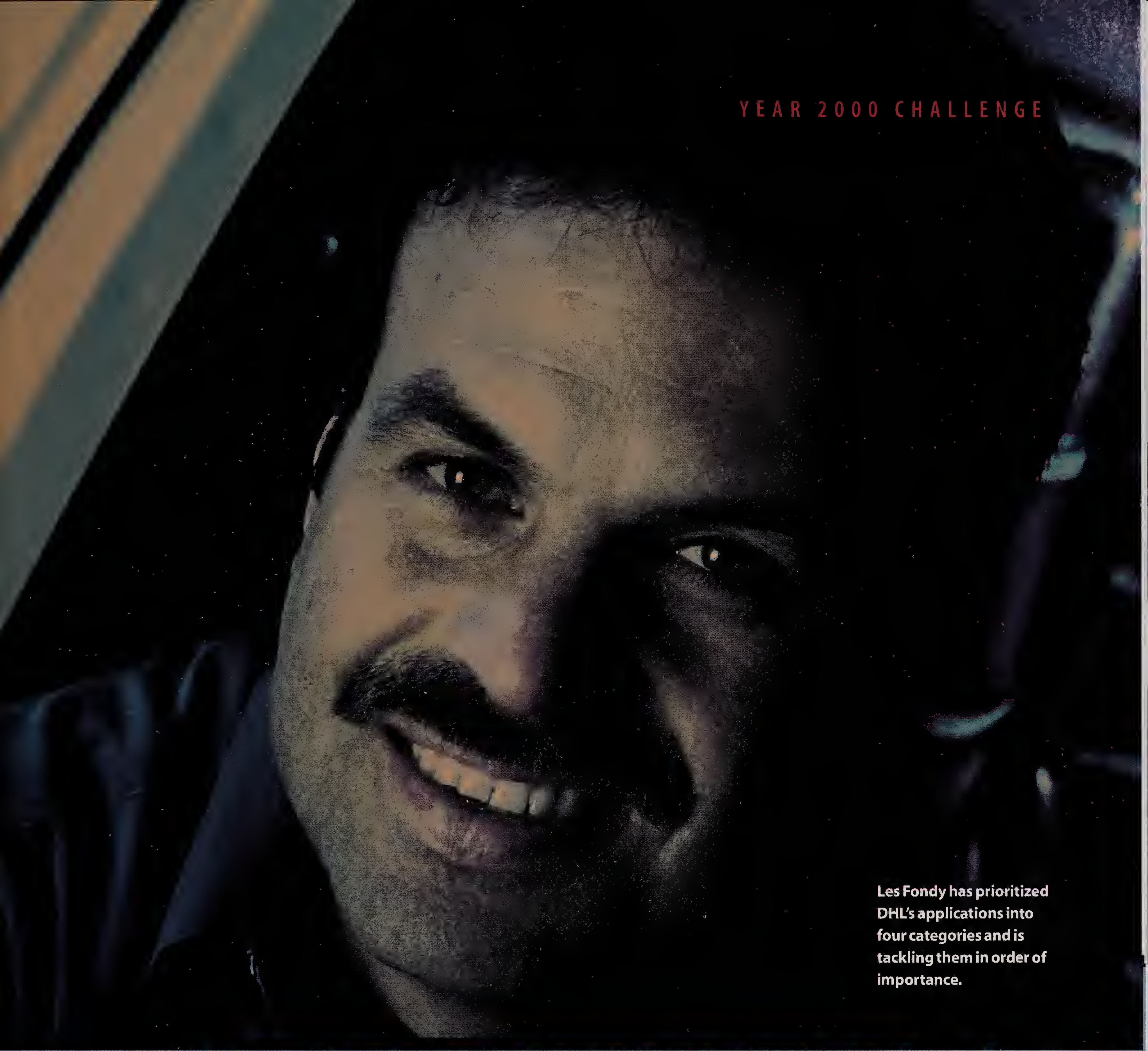
FIXING YOUR YEAR 2000 problems before the New Year's Eve deadline isn't enough—you have to test your applications and make sure they'll really work. In this article, you'll learn

- How long Y2K testing is likely to take
- Where to focus your testing energies
- Who should be responsible for testing

Les Fondy is confident that DHL Airways' fleet of 100 planes will take to the skies on Saturday, Jan. 1, 2000, as fully loaded as they would any day this year or next.

Albert Kern is sure that when Commercial Union Insurance's underwriters come to work Monday, Jan. 3, it will be as easy for them to write policies as it was the week before.

PHOTO BY ED CALDWELL



Les Fondy has prioritized DHL's applications into four categories and is tackling them in order of importance.

Brian D. Robbins is staking his reputation on every single one of Chase Manhattan Bank's approximately 1,600 locations opening for business on the same Monday morning without a hitch.

But how can these executives be so confident as they shepherd their Y2K conversion projects toward completion? Because they're not simply crossing their fingers and hoping for the best. They're deploying massive test efforts, often with the aid of outside consultants and third-party software tools, to make sure broad-ranging, complex Y2K projects will be up and running when the clocks tick to 2000.

Tests are no more fun now than they were in school. But now, as then, your future depends upon them. With your Y2K project, there are different kinds of tests you need to run, and they involve a set of logistics almost as complicated as the remediation process itself. Pencils ready? Let's begin.

If You Test, You're in the Minority

For most companies, unfortunately, testing is at best a rusty skill set. The Software Engineering Institute at Carnegie Mellon University in Pittsburgh estimates that 67 percent of organizations have no formal Y2K testing program in place. Even the praiseworthy 33 percent are finding Y2K testing to be knottier and more problematic than anything they've done before. "Dates are just so all-encompassing that when you start messing with them, every aspect of the system—and all the interrelationships between systems—needs to be tested," says Albert Kern, an assistant vice president and the Y2K project leader at Boston's Commercial Union Insurance.

To add to the burden of making sure all systems are functional, there's the necessity of documenting every last step of the process. "You can't just run these tests," says Greg Pope, president of Azor Inc., a test-tool supplier in Palo Alto, Calif. "You've got to have evidence that you've run the tests and gotten the correct results because if you face litigation [later], you need to be able to prove that you did the testing and were in good shape."

With Y2K projects, testing dovetails with documentation. The two are longtime bugaboos of the IT industry. "What's the first thing that you skimp on when you're running up against a tight time frame and a tight budget?" asks Brian Keane, co-president of systems integrator Keane Inc. in Boston. "Testing, with documentation a close second."

Yet testing is expected to represent half a Y2K project's effort and expense, according to the Gartner Group Inc. Some project leaders, like Nabisco CIO Joseph Farrelly, see the test phase growing to 60 or even 75 percent of the total work. He points out that testing involves third-party software, embedded systems, PCs, custom-written software and, of course, mainframe operating systems and hardware. Even brand-new packages that purport to be Y2K-ready need to be poked and prodded for faults.

All that can be dubbed internal testing. Its various stages include unit testing (looking at individual program components), system testing (ensuring that the units work together) and integration testing (verifying that all the systems interact correctly). An entirely different facet is external testing—making sure the organization's remediated systems will work with those of its business partners, regulators and customers.

Nabisco CIO **Joe Farrelly** *believes the testing phase of Y2K projects may take more time than the coding itself.*

PHOTO BY EDWARD SANTALONE

"You have to devise a sound strategy for getting everything tested on time," says Nabisco's Farrelly, whose company will be spending between $25 million and $30 million on its Y2K project. "And you're going to need as much talent dedicated to testing as to any other part of the project."

How are Farrelly and his fellow IT executives grappling with the testing challenge?

Start Early and Test in Tandem

Testing can't be the last task on a Y2K project time line. "It starts in the beginning, not somewhere in the middle or at the end," says Les Fondy, senior manager for IS process solutions at DHL, the Redwood Shores, Calif.-based U.S. division of DHL Worldwide, a $4 billion air-freight company.

"It takes a long time to set up the hardware and software environment for testing," adds Joseph Allegra, president of Princeton Softech, a software development company in Princeton, N.J., that makes a product that "ages" data for Y2K testing purposes. "It also takes a long time to develop your testing plan."

Testing should begin during the initial assessment phase, when systems are evaluated for their ability to function in a post-2000 world. Systems that are dubbed compliant need to be thoroughly put through their paces. "We've never found a system that was 100 percent Y2K compliant," says William Ulrich, president of Tactical Strategy Group Inc. in Soquel, Calif. He mentions a major travel reservation system that had been given a seal of approval—only it didn't recognize 2000 as a leap year. "If you wait until the year 2000 to fix the bugs in all those systems you thought were OK, you're going to be in deep, deep water," Ulrich says.

There's another kind of testing that can be done at the front end of a project: baseline tests, also known as pretests. Applications that are determined to be unprepared for Y2K probably have other problems, too, which project managers may or may not want to address during the conversion phase. Baseline tests are also useful for gauging the state an application is in before it gets handed off to a service provider for remediation.

Once conversion begins, other testing tasks can proceed in parallel: the design of test cases, the development of an appropriate Y2K testing environment and the assembly of a testing team. And as soon as code is converted, it should be run through the testing process. "Early tests help validate the reme-

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diation process you're using," says DuWayne Peterson, president of IT consultancy DuWayne Peterson Associates in Pasadena, Calif., and the former CIO at Merrill Lynch & Co. Inc. "It may be that there's a flaw, and you'd like to know that sooner rather than later."

How Much Testing, Done by Whom?

A host of questions about testing need to be asked in the early stages of the Y2K project. How much is necessary? Who will do it? Where will it be done? Who decides when an application has been satisfactorily tested? While it's not necessary to have all the answers before proceeding with conversion, it's important to begin exploring the issues.

Most IT executives are feeling the quicksilver passage of time and sense that the best use of it is to focus on their critical applications. "Time is just spinning by," says Nabisco's Farrelly. "We've realized that all we have time to do is test the critical stuff really well." At Nabisco, noncritical applications like decision support systems will be tested last because, as Farrelly puts it, "If the date in a report is incorrect, we'll survive." DHL's Fondy says his company has prioritized its applications portfolio into four categories: critical, high, medium and low. Top priorities include things like aircraft maintenance, package tracking, EDI, customer service and logistics.

This approach can be termed "risk-based testing." The concept: identify the systems that, should they fail, pose the biggest threat to the enterprise's operations. Chase Manhattan's Brian Robbins offers a colorful metaphor for the concept: Risk-based testing is similar to the way white blood cells know how to attack the body's worst injuries first. "You don't want to be floating around looking at small bruises instead of major injuries," he says.

Unfortunately, there's no consensus on who should actually perform the testing. Some, like Fondy at DHL, have hired full-time testers to do the work. His reasoning? "You might as well train them and keep them, and turn them into applications engineers later on." He doesn't see the fiscal or organizational sense in simply contracting for testing assistance. But others say that service providers or contractors can bring the kind of specialized expertise to the test phase that would be tough to find in full-time employees.

Still others contend that no additional resources are necessary. The same programmers who remediated the applications can do the testing. That's the view held by David Mounce, vice president of production operations at Options Clearing Corp. of Chicago, a government-regulated monopoly that clears every options trade for all four U.S. options markets. "I had the guys who were making the changes do the tests," Mounce says. "We started doing it with two separate groups—programmers and testers—but we stopped. It was totally inefficient. We didn't have time for the transition of knowledge from one staff to another."

But having programmers perform testing isn't something everyone recommends. "You need a dedicated quality assurance team that's just doing the testing," argues Peterson, the former Merrill Lynch CIO. "Don't try to commingle it with everything else your programmers are doing."

Regardless of who does the testing, everyone agrees that one part of a test team is indispensable: the application experts. "The application experts need to be the intellectual leaders in testing," says Phil Carrai, president and COO of McCabe & Associates, a Columbia, Md., company that makes assessment, visualization and testing software for the year 2000. "You need their expertise to develop test cases."

Even the companies that enlist service providers to assist with testing won't be able to skimp on the amount of time

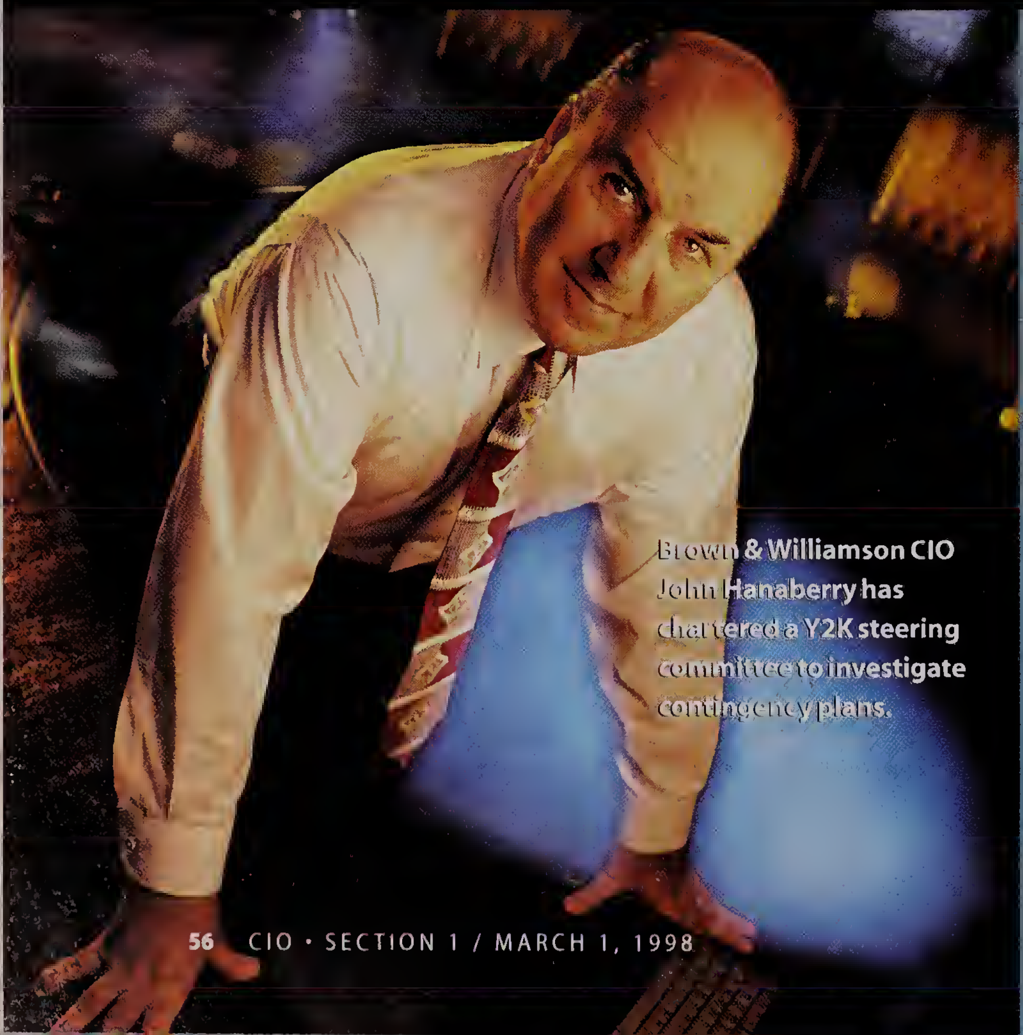
Brown & Williamson CIO John Hanaberry has chartered a Y2K steering committee to investigate contingency plans.

PHOTO BY JOE HARRISON

The "What If" Game

Prepare yourself for every contingency

No matter how thorough an organization's testing effort, there's always the chance that something unexpected will go wrong. Bad data from a business partner could corrupt a database, or an embedded system could wreak havoc on a plant floor. How to prepare for such unpleasant surprises? Contingency planning.

"You need to run the 'what ifs,'" says Pam Fredette, a solutions division president at Computer Horizons Corp. in Mountain Lakes, N.J. "If certain critical business applications fail, how will you get around that?"

Some IT executives scoff at the thought of both doing rigorous testing and constructing a Plan B. "Our contingency planning basically says we'll make it

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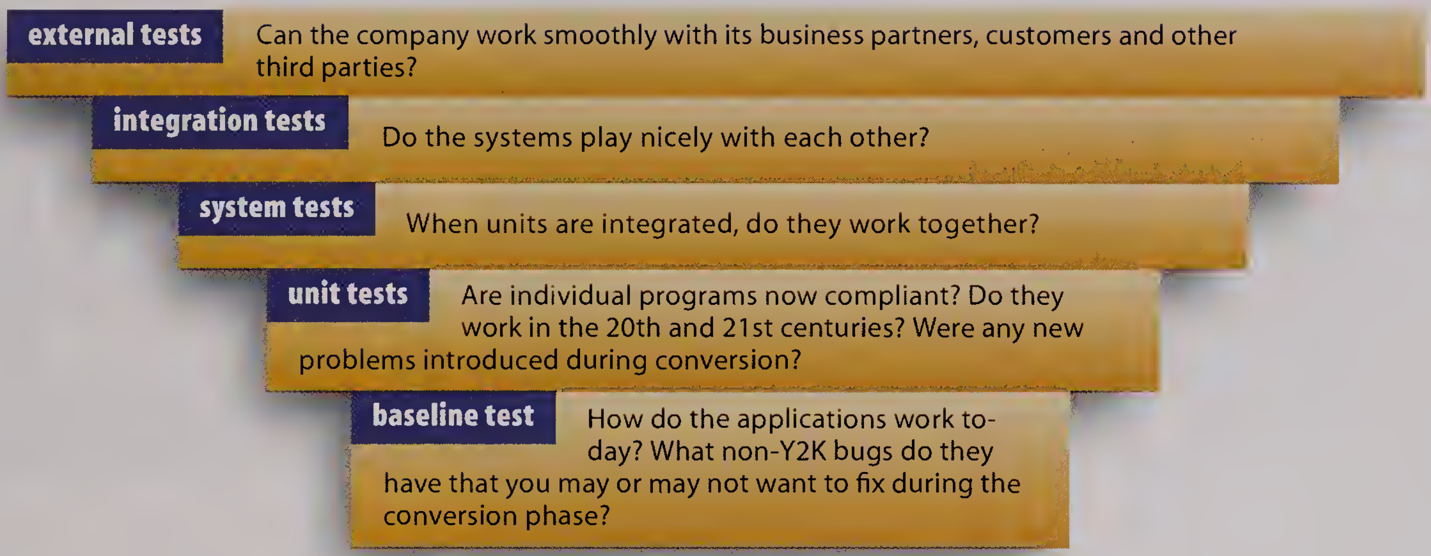

external tests Can the company work smoothly with its business partners, customers and other third parties?

integration tests Do the systems play nicely with each other?

system tests When units are integrated, do they work together?

unit tests Are individual programs now compliant? Do they work in the 20th and 21st centuries? Were any new problems introduced during conversion?

baseline test How do the applications work today? What non-Y2K bugs do they have that you may or may not want to fix during the conversion phase?

required of their applications experts. "The service providers aren't trying to understand your applications," says Princeton Softech's Allegra. "They're doing a mechanical remediation. It's really up to the application experts to supervise the testing."

The experts' services will be in high demand as the test phase gears up, since there's a finite (and, by the way, insufficient) number of people who thoroughly understand a given application. Chase Manhattan, for one, has run into bottlenecks as a result. "This isn't something you can throw money at," says Robbins. "These are people who have to know the business and know what the results should be."

Where Should You Test?

Options Clearing Corp. didn't want to run the risk of testing its debugged code on its production system. Mounce's solution: rent a near-replica of its mainframe from Comdisco Inc., a Rosemont, Ill., company whose primary business is disaster-recovery services. Other companies choose to buy their own backup equipment for testing, outsource the job or test on their own production systems using logical partitions (LPARs). For Mounce, though, none of those was a viable option. "We needed an iron-clad guarantee that the testing wouldn't disrupt our operations," he says. "It's our job to make sure the options industry can perform, and we don't take that lightly."

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work," says David Mounce, vice president of production operations at Options Clearing Corp. in Chicago. "We're not planning on failure."

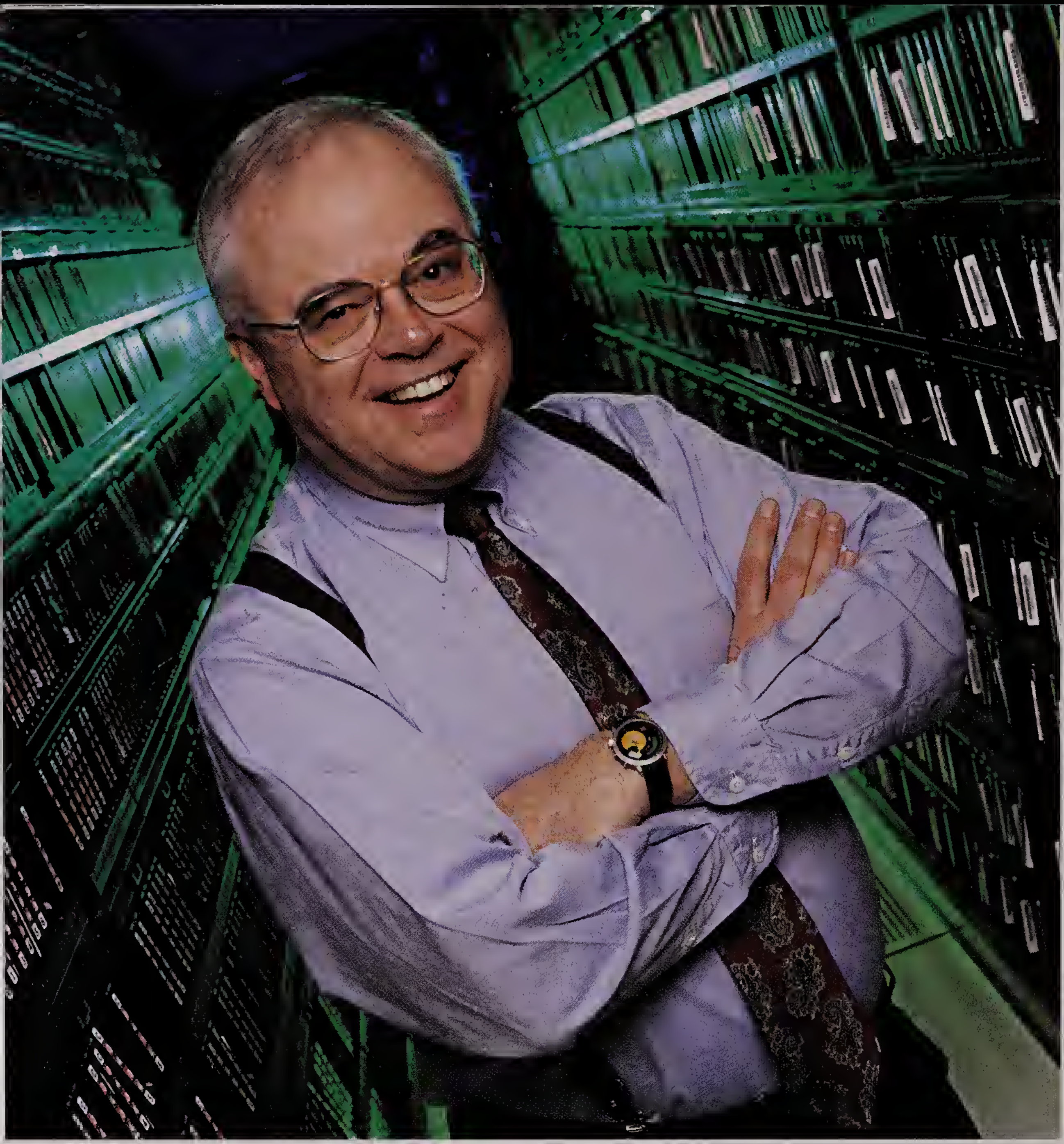
That kind of attitude irks William Ulrich, president of Tactical Strategy Group Inc. in Soquel, Calif. "The guys who know about the problem won't admit that you need a contingency plan. It would be acknowledging the possibility of defeat," he says. "On the other side, the business people aren't aware of the risks of this problem. Because of that, no one's driving."

Someone needs to get in the driver's seat and begin drafting plans for workarounds and backups. "You need to take a look at having a fallback strategy for everything that's critical to the business," says Allan Graham, senior vice president for operations at Comdisco in Rosemont, Ill. "They may be Band-Aids, but they're better than nothing." Graham also recommends having a SWAT team on standby over the long weekend of Jan. 1, 2000, ready to attack unanticipated snafus.

At Brown & Williamson Tobacco Corp., the Louisville, Ky.-based company's Y2K steering committee is responsible for outlining contingency plans. "I've asked everyone in the group to investigate their disciplines and areas," says CIO John Hanaberry. "What if that bank isn't ready, or this distributor or that government agency? How do we respond?" Spreading the work among multiple business units is a good way to make sure that all the important scenarios are explored, says Hanaberry. Having a small group do contingency planning can often be too myopic.

And contingency planning, like every other aspect of the Y2K project, needs to begin as soon as possible. As Ulrich says, "The folklore suggests that the year 2000 problem is isolated to a brief period near the end of December 1999," but that's simply not the case. Applications will fail before that date as well as after it. Solid contingency plans ensure that any failures won't cripple the organization.

–S. Kirsner



Albert Kern, *Y2K project leader at Commercial Union Insurance, worries about testing every single interrelationship between calendar dates.*

PHOTO BY WEBB CHAPPELL

Not surprisingly, Allan Graham, senior vice president for operations at Comdisco, endorses such an approach. "You want to be able to approximate your production system as closely as you can afford to," he says. But he notes that other tacks work, too, like temporarily taking down the production system, if that is an option, or augmenting existing technology for testing.

Most consultants working in the testing field seem to back Graham's view and advise their clients to create independent testing environments to avoid inadvertently contaminating live production data. Other drawbacks to testing on a production system include diminished performance and scheduling problems. "You have to schedule testing around your peak utilization periods, which prolongs the project and makes it more difficult to manage," says Roy Carter, president of Computer Related Concepts Inc., a Fairfax, Va., IT consultancy.

How Do You Know When You're Done?

The IS executives we've cited all aim to have testing completed by late 1998 or early 1999. How will they be sure they're done?

"The answer is, when you have enough documentation to tell your board, your audit committee and your trading partners that you have tested to the best of your abilities," says McCabe & Associates' Carrai. Azor's Pope advises that that milestone is rarely reached after just one or two test cycles. "People think they're just going to run one test and it'll work," he says. "They don't realize that fixes always cause new problems."

End users and internal auditors can help define the finish line for Y2K testing. Additionally, Fondy at DHL recommends something he calls "cross-peer inspections"—getting programming and testing teams to examine each other's deliverables. "The idea is, let me take Joe from Application A and Pete from Application B and have them both inspect what the other has done," says Fondy.

Each of those three parties has a role in determining when testing is complete. Users themselves need to ensure that the application is producing the desired output. Auditors must verify that there were no gaps in the testing process that could expose the company to liability. And peers within IT can hold each other to high standards on a project with plenty of potential to become a deadline-driven mad rush. But what's important is that all three groups share a set of criteria that establish what the organization's goals are for Y2K.

"You need common definitions of compliance," says Robbins at Chase. "When is something tested and ready for the real world?"

What Happens After New Year's Day?

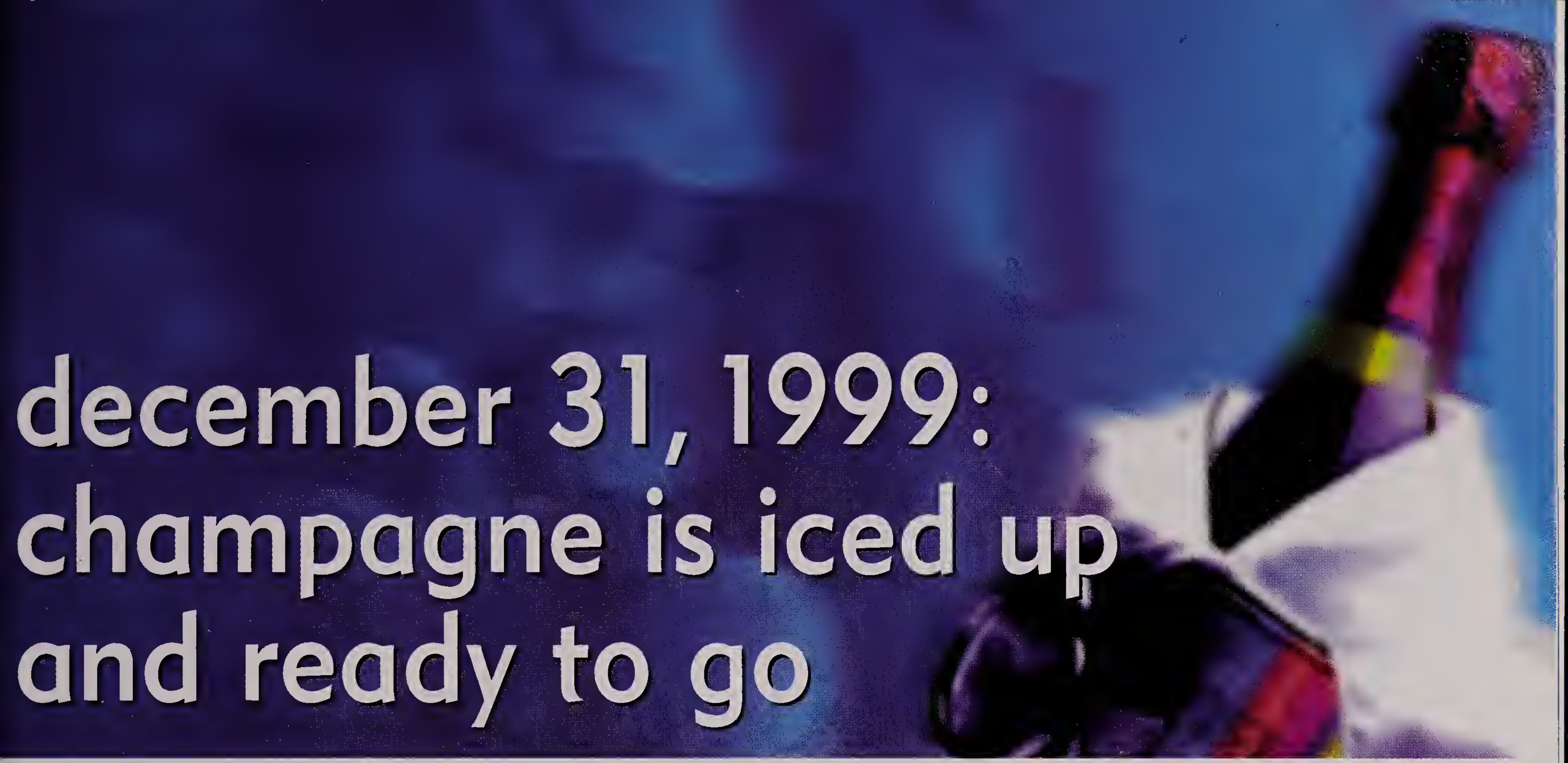
Is thorough testing something companies will resort to only in times of crisis, as with the millennium bug, or will it become standard operating procedure? In other words, can we expect the Software Engineering Institute's 67 percent figure to increase as a result of Y2K? Again, there's no consensus.

"My hope is that this will be a retained competency, and it should be," says Howard Rubin, president of Rubin Systems and chairman of the computer science department at New York City's Hunter College. "Y2K is a wake-up call for bad technology habits."

The skeptics, however, say that some things never change. "A lot of people are treating this as a necessary nuisance that we have to put up with," says Commercial Union's Kern. "They're not trying to look beyond it and see what we can learn and use for the future."

Whether testing wedges its way into every organization's culture or not, there's no denying that it has achieved something of a celebrity status as a result of Y2K. The stakes are high, and testing is crucial to a successful conversion effort. And some of the biggest testing hurdles—for most companies—still remain to be discovered. "We need to get a dialogue going around testing," says Judith List at Morristown, N.J.-based Bellcore, which consults with telephone companies all over the world. "We're only beginning to scratch the surface to see what some of these challenges are going to be."

Scott Kirsner, a Boston-based writer and consultant, is working on a series of articles for CIO *on the Y2K problem. He can be reached at* kirsner@worldnet.att.net.



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For What You're Worth

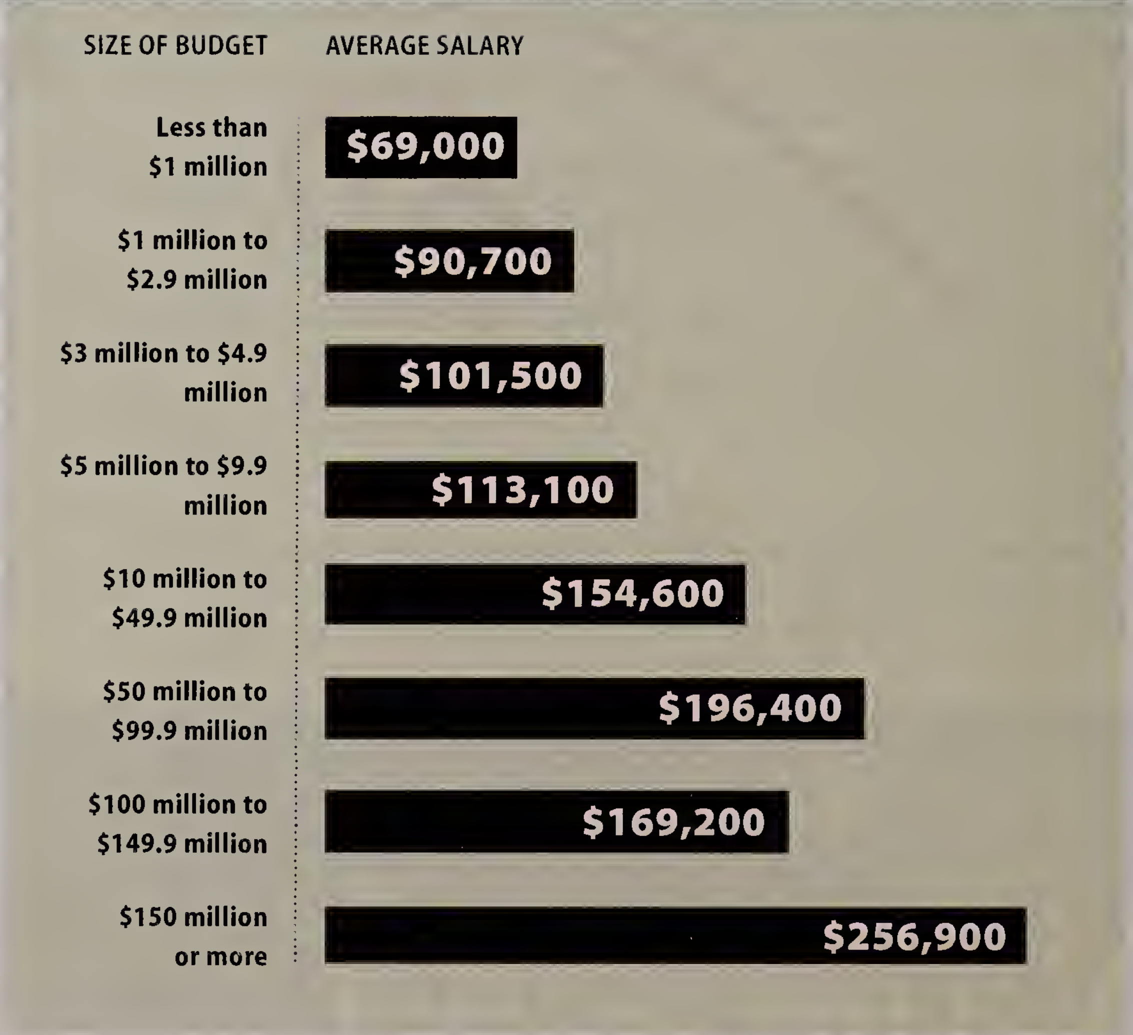
The 1997 *CIO* Executive Survey reveals some predictable results–and some surprises

BY PETER FABRIS

IN THE WORLD OF I.S. MANAGEMENT, IT'S NOT WHAT YOU KNOW; IT'S NOT even who you know. It's what you're called. Job titles seem to make all the difference in how much IS managers earn. The chief information officer title carries a certain cachet that shows in spades when you compare CIO pay with that of other IS executive positions. In a survey of 474 *CIO* readers conducted in October 1997, those who hold the CIO title reported earning an average of $146,100, significantly outearning those holding titles of vice president and director.

According to the 1997 *CIO* Executive Compensation Survey, CIOs earn on average 15 percent more than vice presidents of IS, who earn an average of $126,800, and 72 percent more than directors of IS, who make $84,800. These results mirror our 1995 Executive Compensation Survey, which found that CIOs earned an average of $146,900: 17 percent more than vice presidents and a whopping 91 percent more than directors or managers of IS. Directors of IS registered the largest gains since 1995, when the average director salary was $77,000.

Overall, 1997 survey respondents are earning 13 percent more than they did two years ago. But when compared with the 1995 survey, which queried a different group of readers, the average salary of IT executives changed little over the past two years. The average salary for IS executives in 1997 was $99,000—up just 1.1 percent from the overall average of $97,900 in the 1995 survey. In 1997, two-thirds of all respondents reported receiving an annual bonus. The average bonus was 17 percent of base pay, about the same as in 1995 when the average bonus was 18 percent of base pay.



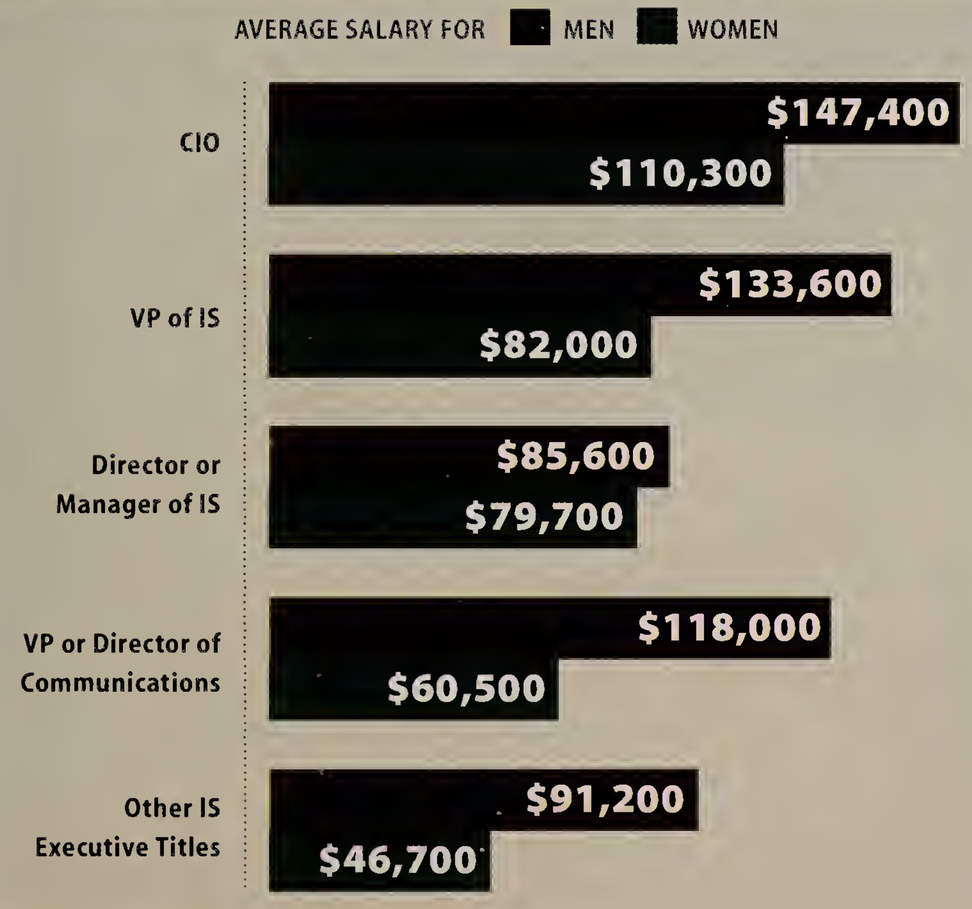
TYPICALLY, THE BIGGER THE BUDGET, THE BIGGER THE SALARY

HOW I.S. EXECUTIVES' FUNCTIONAL CONCERNS AFFECT COMPENSATION

RANK/MOST IMPORTANT FUNCTION	NUMBER OF RESPONDENTS	% SALARY PREMIUM*	AVERAGE SALARY	HIGH SALARY	PERCENTAGE INCREASE**
1. Add value by leveraging IT	117	15.8	$114,600	$412,000	14.9
2. Implement business reengineering	21	10.0	108,900	325,000	12.3
3. Align IS with corporate goals	127	1.8	100,800	370,000	13.4
4. Enable change and nimbleness	33	-3.3	95,700	220,000	15.0
5. Improve the systems development process	23	-6.0	93,100	250,000	8.4
6. Update obsolete systems	25	-10.0	89,100	230,000	13.8
7. Institute cross-functional information systems	47	-14.6	84,500	254,000	11.6
8. Create an IS architecture	21	-14.8	84,300	160,000	11.3
9. Organize and utilize data	34	-15.2	84,000	275,000	11.4
10. Improve IS human resources	4	-22.1	77,100	98,000	7.3
11. Connect to customer/suppliers	10	-25.3	74,000	110,000	11.1

*Percentage that average salary by function is above (or below) the overall average salary for all functions combined
**Self-reported average annual increase in salary over the past two years

THE GENDER GAP PERSISTS



Note: Six male CTO respondents earn an average of $87,500. None of the female respondents hold the CTO title.

MAKING THE BIG BUCKS

THE HIGHEST-PAID EXECUTIVE, A MALE CIO, makes $412,000, 40 percent of which was in the form of a bonus last year. He works for an IS consulting company with annual revenues of more than $2 billion, is 43 years old and has 20 years of IT experience. He oversees a staff of 800 people and controls an annual budget of more than $150 million.

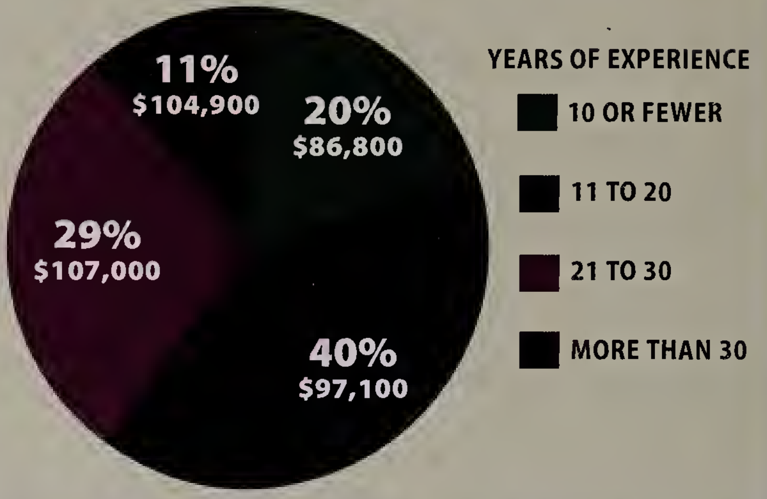
THE HIGHEST-PAID FEMALE EXECUTIVE, a director of IS, makes $210,000 with no bonus. She works for a financial services company with annual revenues of between $500 million to $1 billion. She is 34 years old and has five years of IT experience. She oversees a staff of 20 and has an annual budget of $3 million to $5 million.

The latest survey found a significant range in IS management salaries. The highest-paid executive in the survey, a CIO, earns $412,000. The lowest-paid manager, a director of IS, makes $29,100. Company and IT budget size have a large impact on IS executive salaries. Those employed in companies with over $1 billion in annual revenues earn an average of $123,600, while those in organizations with annual revenues of $50 million or less make an average of $74,300. IS executives who oversee budgets of $150 million or more make an average of $256,900, while those who preside over a budget of $1 million or less earn an average of $69,000.

According to the survey, it pays to change jobs. Those who were promoted or switched companies within the past two years make an average of $104,700, 11 percent more than the average of $94,600 for those who stayed put in that same time period. Nearly half of the respondents, 45 percent, were promoted or changed jobs during the past two years. Those who made a

EXPERIENCE PAYS, TO A POINT

PERCENTAGE OF RESPONDENTS/AVERAGE SALARY



CHIEF INFORMATION OFFICER PROFILE

Average Salary: $146,100

WHAT DETERMINES SALARY	AVERAGE SALARY	HIGH SALARY	% INCREASE*
NUMBER OF EMPLOYEES SUPERVISED			
1-5	$91,400	$150,000	8.6
6-10	164,500	222,500	22.7
11-20	138,800	325,000	18.8
21-50	101,500	132,000	9.2
More than 50	145,000	270,000	17.1
GENDER			
Male	$147,400	$412,000	17.9
Female	110,300	167,500	14.5
COMPANY SIZE			
Less than $50 million	$124,900	$325,000	11.4
$50 million to $100 million	103,000	150,000	16.9
$101 million to $500 million	146,900	235,000	23.1
$501 million to $1 billion	136,000	183,000	14.3
$1 billion to $2 billion	209,700	320,000	28.2
More than $2 billion	198,300	412,000	11.4
EDUCATION			
No college degree	$98,600	$170,000	15.4
Undergraduate degree	147,100	412,000	19.1
MBA	169,300	412,000	18.3
PhD	99,000	150,000	1.3
MOBILITY**			
Has changed jobs	$136,300	$320,000	23.6
Has not changed jobs	155,100	412,000	12.3
MOST IMPORTANT JOB FUNCTION			
Align IS with corporate goals	$153,700	$285,000	19.5
Add value by leveraging IT	155,500	412,000	20.2
Implement business reengineering	158,500	325,000	15.8

As in the survey, IS executives for high-tech companies reported the highest average pay. The 27 respondents in the computer services industry reported earning the most, with an average of $130,300. Next came high-tech manufacturing, in which the 14 respondents earn an average of $124,500. Government IS executives—46 of whom answered the survey's salary question—reported the lowest average pay at $69,200.

*Self-reported average annual increase in salary over the past two years
**Mobile executives are those who have changed jobs or been promoted over the past two years

VICE PRESIDENT OF INFORMATION SYSTEMS PROFILE Average Salary: $126,800

WHAT DETERMINES SALARY	AVERAGE SALARY	HIGH SALARY	% INCREASE*
NUMBER OF EMPLOYEES SUPERVISED			
1-5	$94,300	$160,000	12.1
6-10	101,000	150,000	9.7
11-20	117,900	155,000	18.8
21-50	135,400	265,000	25.8
More than 50	158,900	275,000	11.0
GENDER			
Male	$133,600	$285,000	14.2
Female	82,000	165,000	25.8
COMPANY SIZE			
Less than $50 million	$91,000	$165,000	21.0
$50 million to $100 million	101,900	150,000	18.9
$101 million to $500million	126,800	265,000	9.4
$501 million to $1 billion	135,200	200,000	20.4
$1 billion to $2 billion	139,100	180,000	20.3
More than $2 billion	164.60	285,000	12.9
EDUCATION			
No college degree	$115,800	$265,000	15.2
Undergraduate degree	122,200	275,000	17.4
MBA	132,500	254,000	12.0
PhD	–	–	–
MOBILITY**			
Has changed jobs	$124,800	$254,000	24.0
Has not changed jobs	128,500	285,000	8.4
MOST IMPORTANT JOB FUNCTION			
Align IS with corporate goals	$116,200	$230,000	11.7
Add value by leveraging IT	159,400	285,000	23.1
Institute cross-functional information systems	122,000	254,000	16.9

*Self-reported average annual increase in salary over the past two years

**Mobile executives are those who have changed jobs or been promoted over the past two years

When ranking salaries according to region, IS managers in the Northeast came out on top. Executives in the Middle Atlantic states make the most, with an average salary of $113,900. New England is next, with $106,900. IS executives in the Southeast have the lowest average salary at $85,100.

change within the past two years received an average salary increase of 18 percent, while those whose job status remained the same received an average increase of 9 percent.

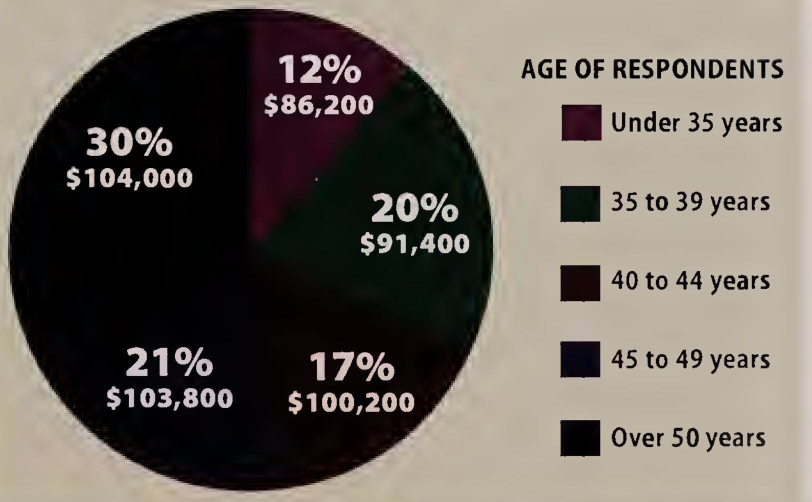
In a field dominated by men, it's perhaps no surprise that a salary gender gap exists. That gap has increased in the past two years, according to our surveys. On average, the 1997 survey shows that men earn 30 percent more than women, up from a 26 percent difference in 1995.

The IS salary gender gap shown in our survey reflects the state of things in all occupations, according to David Foote, managing partner of Cromwell Foote Partners LLC, a Stamford, Conn., consultancy that specializes in IS human resources. In most salary surveys in just about every field, men earn 25 to 30 percent more than women, Foote says. The IS profession is no different.

One explanation for the salary discrepancy is that men are more likely than women to hold the top IS management posi-

UNDER 50? PAY WILL GROW AS YOU AGE

PERCENTAGE OF RESPONDENTS/AVERAGE SALARY



tions within large companies. About 33 percent of the men who responded to the survey work for Fortune 1000 companies, while 23 percent of the women do. On average, male IS executives in our survey preside over an annual budget of $11.3 million compared with $2.8 million for their female counterparts. Only two of the 55 executives holding the highest-paying IS title, CIO, are women.

In contrast to the gender salary discrepancy, the gap between the highest-paid man and highest-paid woman narrowed from the 1995 survey to the 1997 survey. In the current survey, the highest-paid man earns $202,000 more than the highest-paid woman. In the 1995 survey the gap was $535,000. On the bright side for female IS executives, they receive a higher percentage increase in pay than men do (24 percent versus 18 percent) when they are promoted or change jobs.

In addition to a gender gap, an age gap also exists in the IS field. IS executives younger than 35 earn an average of $86,200, while those over 35 earn an average of $104,000. Generation X-ers earn the least. On average, those in their 20s earn $67,000. Average salary jumps to $90,600 for those aged 30 to 34. The average salary for all age groups over 40 topped $100,000. The three executives—all men—in the 65 to 69 age group earn the highest average pay at $121,900.

In one area in particular, survey results remain staunchly the same. The typical profile in age and experience of an IS executive is exactly as it was two years ago. The average age of all respondents is 45, and the average years of IT experience is 19 in both surveys. However, the average number of subordinates differed significantly between the two surveys, declining from 52 in 1995 to 39 in 1997.

There are countless ways to slice and dice the statistics in a survey. But the primary factors in determining whether you're getting your fair share are your organization's size, your annual budget and how many people report to you. If those numbers are high and your industry pays IS executives handsomely, you should earn well above the average.

Staff Writer Peter Fabris can be reached at pfabris@cio.com.

HOW INDUSTRIES STACK UP IN THE I.S. EXECUTIVE COMPENSATION GAME

RANK/INDUSTRY	NUMBER OF RESPONDENTS	AVERAGE SALARY	HIGH SALARY	% INCREASE*	% SHARE W/BONUS**	SIZE BONUS**
1. Computer services, software	27	$130,300	$412,000	17.3	77	21.4
2. High-tech manufacturing	14	124,500	225,000	14.9	77	21.3
3. Publishing, broadcast, advertising, PR	11	123,800	235,000	15.6	91	22.4
4. Communications services	11	118,800	285,000	27.6	91	17.1
5. Finance, banking, accounting	42	106,700	320,000	17.8	80	21.3
6. Utilities (electric, gas, etc.)	12	105,700	230,000	7.4	46	16.6
7. VAR, VAD, systems or network integration	6	105,500	167,500	15.0	83	23.0
8. Health care/pharmaceutical/medical services	54	104,400	285,000	14.1	65	16.9
9. Wholesale, retail trade	26	102,400	220,000	11.9	70	21.6
10. Insurance, real estate, legal	37	99,200	250,000	15.1	84	18.4
11. Manufacturing (not high-tech)	87	98,800	325,000	10.8	77	14.1
12. Other business services	31	96,000	157,500	21.1	80	14.9
13. Construction, agriculture	13	94,200	130,000	9.4	67	9.1
14. Transportation services	11	86,300	156,000	12.0	36	16.5
15. Military	14	83,000	150,000	5.0	62	10.8
16. Education	20	70,200	100,000	7.4	6	10.0
17. Government	47	69,200	115,700	6.5	21	13.7

*Self-reported average annual increase in salary over the past two years

**Bonus columns are (1) percentage share of respondents who got a bonus over the past two years and (2) the average size of bonus as a percentage of average base salary

DIRECTOR OR MANAGER OF INFORMATION SYSTEMS PROFILE — Average Salary: $84,800

WHAT DETERMINES SALARY	AVERAGE SALARY	HIGH SALARY	% INCREASE*
NUMBER OF EMPLOYEES SUPERVISED			
1-5	$69,400	$156,000	11.1
6-10	79,100	250,000	10.1
11-20	92,200	210,000	14.3
21-50	98,300	175,000	12.6
More than 50	110,000	144,000	11.1
GENDER			
Male	$85,600	$250,000	11.6
Female	79,700	210,000	13.3
COMPANY SIZE			
Less than $50 million	$68,100	$250,000	11.6
$50 million to $100 million	74,600	140,000	12.7
$101 million to $500 million	87,800	168,000	9.8
$501 million to $1 billion	101,100	210,000	16.7
$1 billion to $2 billion	94,500	132,000	10.8
More than $2 billion	103,700	215,000	12.7
EDUCATION			
No college degree	$75,400	$156,000	8.4
Undergraduate degree	85,700	215,000	12.8
MBA	95,600	160,000	13.3
PhD	109,600	250,000	7.2
MOBILITY**			
Has changed jobs	$91,200	$210,000	16.8
Has not changed jobs	80,300	250,000	8.3
MOST IMPORTANT JOB FUNCTION			
Align IS and corporate goals	$83,500	$160,000	12.7
Add value by leveraging IT	95,500	215,000	11.7
Institute cross-functional information systems	76,800	133,000	10.7

*Self-reported average annual increase in salary over the past two years

**Mobile executives are those who have changed jobs or been promoted over the past two years

When asked to identify their most important job function, 27 percent of the respondents said "aligning IS and corporate goals." Another 25 percent said "adding value by leveraging IT" is their top priority. And another 10 percent said "instituting cross-functional systems" is their main objective. These were also the top three responses in the 1995 survey.

ABOUT THE *CIO* EXECUTIVE COMPENSATION SURVEY

In October 1997, *CIO* magazine mailed 3,000 surveys to CIOs and other IS executives chosen at random from our subscription list. By Nov. 7, we received 474 usable surveys for tabulation. The survey was administered by IDG Research Services Group, a sister company to CIO Communications Inc.

This survey reflects a cross section of IS executive positions and is not solely focused on the CIO title. Respondents represent a wide range of company sizes and industries including government. Thus our average salary findings are lower than those of other studies that focus on IS positions in large corporations.

By title, 12 percent of the respondents are CIOs; 1 percent are chief technology officers; 14 percent are vice presidents of IS, management information systems or data processing; 63 percent are directors or managers of IS/MIS/DP; and 3 percent are vice presidents, directors or managers of data or voice networking and communications.

Every region, industry and job function was represented in our survey. That allowed us to cross-tabulate a variety of data to explore the significant correlations between salary levels and education, age, experience, size of company, budgets and other factors. The summary of the survey results presented here touches on only a portion of the data. *CIO* readers may want to consider exploring the salary yardsticks in more detail to benchmark against individual experiences and backgrounds and to help manage salary invitations.

You can order the complete 1997 *CIO* Executive Compensation Survey results for $395. For additional information, please contact Lisa Kerber, editorial operations manager, at 508 935-4449 or via e-mail at *kerber@cio.com.*

Emerging Technology

THE STATE OF THE ART,
NEW PRODUCTS
AND STAYING AHEAD
OF THE CURVE

Edited by Howard Baldwin

Will the Message Get Through This Year?

Complete interoperability is still an issue for message-oriented middleware, but the application development process may be getting easier

BY PETER RUBER

MESSAGE-ORIENTED MIDDLEWARE (OR MOM, as we affectionately call it) has been around for some years. But only recently, with Microsoft's announcement that it will release Microsoft Message Queue (MSMQ) for Windows NT, has this popular subset of middleware been getting the kind of attention it deserves.

Middleware has suffered from too little public awareness, because "we [as an industry] haven't done an effective job educating corporate developers about what our products and tools can do," admits Bob Scher, president of the Message Oriented Middleware Association (MOMA).

Middleware has also suffered from a lack of standards, say analysts. There are too many vendors hawking proprietary products that have less than satisfactory interoperability with the products of other players. Users don't want to be locked into using a single suite of products. They want to choose best-of-breed solutions that will solve their particular system requirements and create a middleware infrastructure with less pain.

IN THIS SECTION

- User Interfaces
- Video Mail Camera
- Telephony Tools
- Break-In Detection
- Fast Servers

What MOM Does

Messaging is the most important component of middleware. It handles all the interprogram communication logic through message queues. The more sophisticated MOMs provide other management-layer services such as security and the ability to optimize buffer size.

MOM also performs neat tricks like enabling messages to be sent and received when the program at the opposite end isn't running. In addition, through its use of asynchronous communication, the sending program does not have to wait for the receiving program to reply; once it's started sending a message, it can continue without interruption.

Some people equate MOM software with e-mail and answering machines—that is, you can send or leave a message knowing that receiving parties will eventually pick them up and respond when they need to. This contrasts with the communications approach used in products that use remote procedure call (RPC) technology, which is tightly coupled and conversational in style. RPCs require both ends of the communications pipeline to be connected at the same time, and neither end can do anything else until it hangs up.

Even with its enhanced features, MOM vendors have kept an unintentionally low profile. "They've been struggling to define themselves. Only IBM, with MQSeries, has been successful," says Karen Boucher, vice president with The Standish Group International Inc. in Dennis, Mass. Other vendors, she says, talked only about the layers directly above the protocols, and doing asynchronous and

ILLUSTRATIONS BY MARK SHAVER

peer-to-peer communications. "Nobody knew what that meant, nor did they want to talk about it."

The Bigger Picture

As a result, the current middleware vendors welcome Microsoft to MOM's world. "We love the fact that Microsoft has come into the middleware market. They now have educated the entire community about for the need for middleware," says Jack Bissell, a chief technical officer for NCR Corp.'s Top End division, which makes a transaction processor that incorporates messaging.

Of course, it's not clear that Microsoft understands the importance of interoperability. Since MSMQ works only with Windows NT, the company hopes MSMQ customers will first siphon legacy data off mainframes and move it to Windows NT servers. Eric Woods, senior analyst for Ovum Ltd., in London, reports that when asked how its products will interoperate with Unix, a Microsoft employee replied, "Who wants to interoperate with Unix?" (Nevertheless, Microsoft is working with Level 8 Systems of New York City for interoperability with non-Windows NT systems.)

Customers Find the Way

Clearly, CIOs are concerned about interoperability. Many companies have already discovered how they can use message-oriented middleware to deliver legacy-based information assets to the enterprise. IS developers are using some creative methods to accomplish this. Rather than rewrite mountains of Cobol or RPG code, or wrap data within object request brokers or C code, they're building three-tier architectures in which intermediate servers host the middleware infrastructure. These intermediate servers, using message-oriented middleware, extract data from the legacy systems and convert it into formats readable by databases from Oracle Corp., Informix Software Inc. and Sybase Inc.

Bank of America recently launched a system it calls DOM (Data Object Manager), which enables any client to retrieve multiple data types from multiple mainframes (among other back-end systems) with a single request. The

Such an Intelligent Face

In the lab, researchers are trying to make what users see more lifelike

IT'S SAID—OFTEN WITH A SIGH—that computers would be a lot easier to use if software tools more closely resembled what we see in the real world. While we've made great strides in system usability since the days of the C prompt, several projects are now underway that would allow computers to relate to users in even more human-like terms. Researchers believe that the more intuitive a user interface, the less likely a user will be confused and waste time. The ultimate result: a boost in productivity.

USER INTERFACES

The goal of interface developers should be to make people feel comfortable, says Doree Seligman, a distinguished member of Bell Laboratories' research staff. "Using metaphors that relate to real-world objects is a good way to make technology less confusing and intimidating," she adds.

Seligman is working on something that could be the perfect antidote for people who don't update their Web pages. Called Live Web Stationery, this technology uses a paper metaphor to show a Web page's current status. Like real paper, the Live Web Stationery page yellows with age and collects dust from disuse. As more users access the page, it becomes deformed from handling and begins to show tears and ragged edges. Coffee stains indicate that the page has been read and fingerprints show that embedded links have been followed. It lets users judge, at a glance, whether it is worth reading. "If a page is yellow and worn, it likely doesn't have up-to-date information. On the other hand, to a researcher, a worn document might be worth examining for its historical content," notes Seligman. (Of course, a page that's been accessed frequently may also be full of information a lot of people wanted, too.)

Another Bell Laboratories project, Sand Typewriter, is a "temporal" bulletin board that allows users to leave messages that remain visible for a predetermined length of time. The product utilizes a beach metaphor and allows users to type notes, which are then converted into a font that looks like someone used a stick to scrawl their notes into digital sand. Visitors can view different messages by "walking" along the interface's simulated coastline. Messages are erased at the appropriate time by a wave rolling in. The system is designed for short-term messaging applications—such as reminders for workgroup members—or online conferencing. (For more information on Bell Laboratories' user interface research, go to *medusa.multimedia.bell-labs.com.*)

What may be the ultimate in intuitive user interface technology can be found in the virtual reality-like office of Ted Selker, a fellow in IBM's ergonomic research group. Selker's Room with a View prototype uses wall-projected bookshelves to represent data stored on his computer. To access a desired piece of information, Selker points his "viewboard"—a high-resolution LCD tablet—at the appropriate volume on the bookshelf, clicks a button, and the information appears instantly on his screen.

"The goal is to make computers look less like computers," says Selker. "Changing the way computers interface with people will not only change the way people use computers but will ultimately change computers, too."

–John Edwards

servers collect this information simultaneously.

The DOM infrastructure was developed over 18 months by Concord, Calif.-based Concorde Solutions Inc., using off-the-shelf middleware from Hitachi America Ltd., IBM Corp. and others, says Isaac Applbaum, CEO of this Bank of America subsidiary. "It wasn't easy," he admits, "but if we had to build DOM from scratch, we'd probably still be on the job two years from now. Rewriting the old databases was not an option."

Interoperability goes both ways. Companies are also building middleware bridges to turn their legacy systems into giant Web servers that clients can access over the Internet using a Web browser.

First Chicago/Mercantile Systems, under an outsourcing contract from the IRS, is using message-oriented middleware to streamline the electronic transfer and improve accuracy of corporate tax deposits between local banks and the regional Federal Reserve banking system. "We like to think we're improving the IRS's image," says Mari Beth Anderson, manager of technology for First Chicago Mercantile.

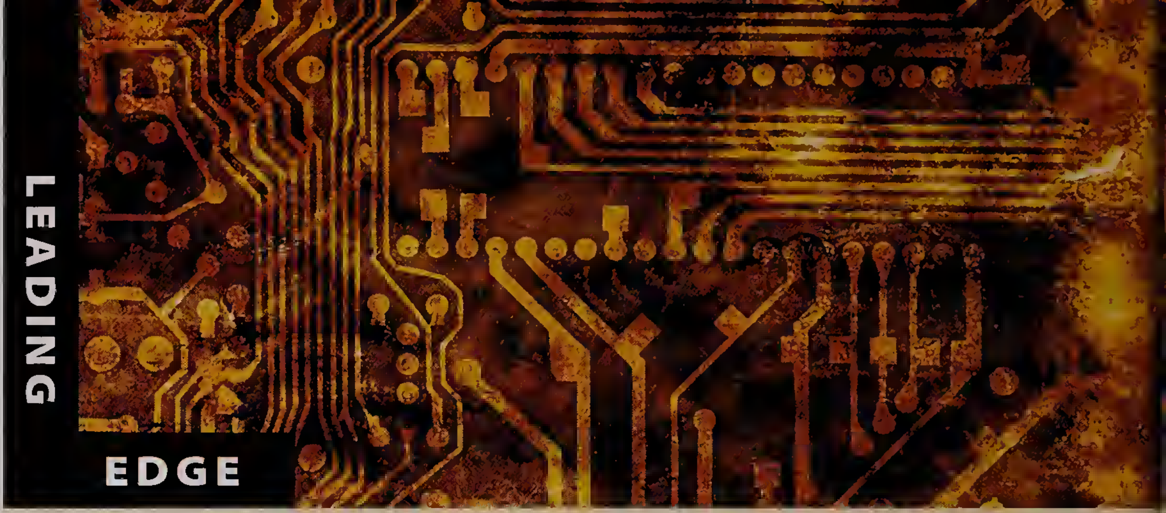
What makes this application unique, Anderson points out, is that it will run from her company's Web page. First Chicago will resell and customize the software for other banks, as well as act as a giant nationwide clearing house for the IRS.

NCR's Top End, an enterprise-level TP monitor, provides a variety of middleware services, including "updating our Informix and Oracle databases in real-time to database replication," Anderson says. "It also manages the message passing between heterogeneous systems." Anderson's group also used Sun's Java and Symantec Corp.'s VisualCafe to develop the Web portions of the application.

Even so, interoperability continues to be a concern for CIOs and their staffs. Kim Kazmaier, senior software engineer for NationsBank in Charlotte, N.C., is working on reengineering the bank's global finance applications, which will run over the bank's intranet and the Internet. Kazmaier explains, "We want to present messages to those legacy applications in a way they can easily understand them, and effect the transfer of information."

Instead of buying all of the components necessary for a middleware framework, Kazmaier is building his own with distributed objects he's creating with Visigenic's VisiBroker residing on top of an IBM MQSeries messaging foundation. The legacy applications are running on MVS mainframes and AS/400 systems. Data is brought to intermediate HP/UX servers, where TSI's Mercator, another messaging middleware product, maps the data to the applications running on Windows NT workstations.

Even so, the MOM products aren't enough. Still more of the links are made with C and Java.



A Camera for Video Mail

YOU MAY WANT TO CONSIDER MAKING SURE YOUR CLOTHES are color-coordinated if you invest in the Zoom Telephonics Inc. **Zoom/Video Cam**, a color, full-motion video camera for teleconferencing, image capture and video mail. About the size of an apple, the camera includes software for sending video mail (which the recipient can play without special hardware or software), playing real-time video over the Internet or through a dial-up network, and for capturing images. The camera is also compatible with applications such as Microsoft NetMeeting, Intel VideoPhone, White Pine Software CU-SeeMe or other software using the H.323 or H.324 videoconferencing standards.

The camera works with the Zoom/Video Ready fax modem or any other modem that supports the V.80 standard (including most 33.6 and 56K fax modems). For users without a Zoom fax modem, the camera comes with an ISA card for image capture. The camera is designed to adjust for exposure, gain and the flickering of fluorescent lights; its frame rate can be set up to 15 frames per second (by comparison, television broadcasts at 30 frames per second). The Zoom/Video Cam has an estimated retail price of $129 and works with any PC running Windows 95. For more information, contact Zoom at 800 631-3116 or visit *www.zoomtel.com.*

Telephony for Telemarketing

NOT EVERYONE IS TRYING TO REACH YOUR COMPANY through the Web. Some people are using the plain old telephone to get information or order products. To this end, Core Systems has designed **DialPro**, a telephony software development tool for telemarketing applications. DialPro incorporates both interactive voice response (IVR) and computer telephony integration (CTI) so customer inquiries can be handled by a live representative or the computer, depending on need.

Integrated with a customer database and using Caller ID, DialPro can create "screen pops" at customer service reps' monitors so that they know who the customer is and get a sense of their interests. DialPro can also set up a system whereby representatives can transfer calls into the system so customers can make requests using a touch-tone menu. The software can also schedule call-backs and send electronic information to customers.

The DialPro application requires at least a 133MHz Pentium PC, a four-port Lucent Technologies RDSP 432 computer telephony board, 32MB of memory, sound card and speakers. A complete system with a basic integrated application starts at $15,400. Contact Core Systems at 713 529-1151 or *freeweb.pdq.net/hardcore/.*

Kazmaier prefers the Java-based tools. "They're much easier to code and debug," he says. "Java includes many middleware functions and class libraries. Programming with C for a distributed development environment is more difficult."

Both Kazmaier and Applbaum say that while bringing legacy data from back-end systems to the enterprise is a simple concept, executing the mechanisms that accomplish this are another matter. There are pitfalls and incompatibilities between various middleware components that still need to be resolved, but the effort beats rewriting decades of accumulated code.

What Users Want

Middleware vendors are striving to make building application infrastructures a "point-and-click, drag-and-drop" development process, much like the 4GL and common object request broker architecture (CORBA) tools deliver today. For Kazmaier, though, CORBA tools work better at developing user interfaces than "the middle area where you're trying to build server code."

The intense focus on the Internet and the Web has made middleware the distributed platform of the future, and MOM vendors are attempting to show they can bring added security, functionality, and performance to Internet-based applications, particularly in the area of electronic commerce. But there are other features the middleware industry as a whole still has yet to address, including the ability to deal with load balance and redundancy. Strategic middleware components, such as directory support and directory management, will need to improve as well.

Unfortunately for CIOs, there is no one-stop shopping for middleware yet. While MOM vendors constitute the largest segment of the middleware market (approximately 85 percent, according to The Standish Group), their turf is being invaded by object request brokers (ORBs), which are off-the-shelf components encapsulating ready-to-use code for middleware and application logic. Boucher calls it "a sexy technology."

However, while ORB and MOM vendors often bid for the same piece of business, most ORBs do not as yet offer some of the key features MOM products have—namely, guaranteed delivery, message prioritization and information-only message passing.

In the meantime, it's up to CIOs and their IS staffs, faced with overlapping messaging services—not only in ORBs but in TP monitors as well—to create their own middleware infrastructures.

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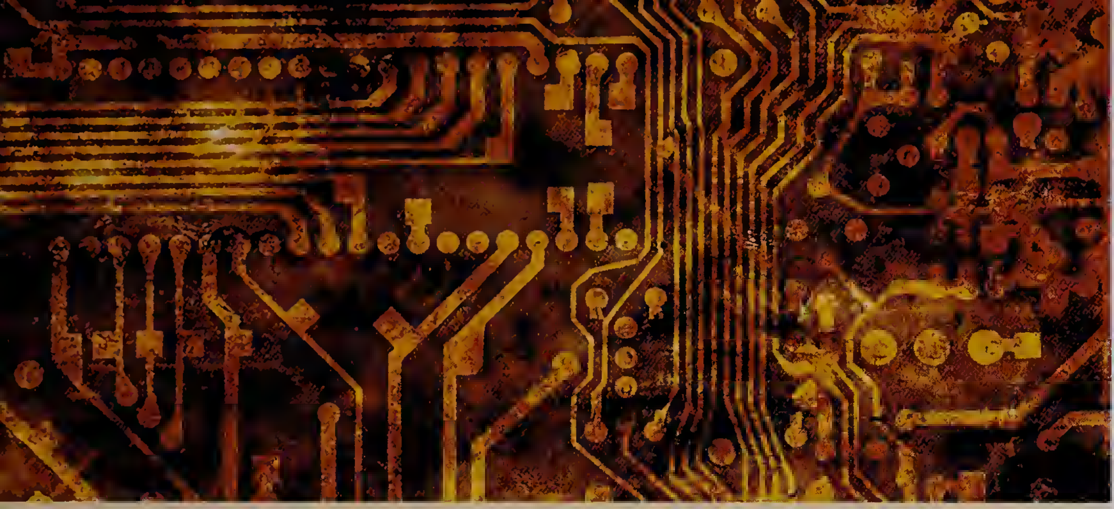

Once More into the Security Breach

MANY ORGANIZATIONS ARE UNDER ATTACK BY DISGRUNTLED insiders, prying competitive outsiders and arrogant hacks who are discovering increasingly innovative ways to break into sensitive information. In the Computer Security Institute's (CSI) 1997 Computer Crime and Security Survey, 59 percent of the 563 organizations surveyed reported losses of more than $100 million from these security breaches. In response to this kind of threat, Axent Technologies Inc. has developed an enterprisewide host-based detection system backed by a security SWAT team.

Intruder Alert is a rule-based centralized host detection system that alerts security managers in real-time when a potential hack is taking place. The software monitors audit trails throughout distributed computing platforms looking for anomalies. When it finds one, it automatically neutralizes it and alerts the network manager via e-mail, pager or other designated means.

Intruder Alert is based upon the research of Axent's SWAT Team, a group of computer security professionals who go undercover as needed to find the latest computer security threats. The team's findings are included in the software as icons that network managers can drag and drop onto the network to protect it in full against intrusions. Over 200 security scenarios are included in this version. As the SWAT team discovers new threats, it posts them for downloading on the company's Web site.

The cross-platform Intruder Alert is composed of three pieces: a user interface for PCs running Windows 95 or NT; a manager running Novell NetWare, Windows NT, DEC OpenVMS or several versions of Unix; and an intelligent agent that resides on all devices throughout the system.

Intruder Alert costs $1,995 per manager, $995 per agent server and $95 per agent workstation. Volume discounts are available for large enterprises. Contact Axent Technologies at 800 298-2620 or visit *www.axent.com/swat/swat.htm.*

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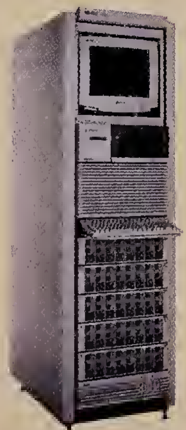

TARGETING ENVIRONMENTS THAT REQUIRE HIGH-availability systems, Hewlett-Packard unveiled its **NetServer LXr Pro8**, a server running Windows NT and outfitted with two 200MHz Pentium Pro processors. The system can be upgraded with up to three dual-processor cards for a total of eight CPUs. Outfitted with 256MB of RAM, the server can be upgraded to 8GB of RAM.

The server can be outfitted with up to three 4.2GB or 9.1GB hard drives, or two hard drives and a 24GB DAT drive, as well as RAID support. The server can stand alone or be rack-mounted (up to four can be mounted on a single rack). It also features 8 PCI slots and power supplies that can be swapped without turning off the machine. Price for a base configuration is expected to be around $30,000, including site preparation and installation. Contact Hewlett-Packard at 800 322-4772 or visit *www.hp.com/go/netserver.*

CIO

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Shop Talk

Kendall-Jackson's Vince Barriero on IS/Business Relations

PHOTO BY ED CALDWELL

CIO: What, to you, is the ideal role of the CIO?
The consummate senior IS director acts as the bridge between the organization's business side and its IS department. A good IS executive will learn the business, and then take that understanding back to IS to produce the support systems that truly reflect the business strategy.

It is the role of IS and a good CIO to facilitate the goals of the organization. If the CIO is immersed in the business side of things, he or she can go back to IS saying, "This is what we need to do." That's very different from a typical IS department that sits with users and says, "Tell me what you need."

How does knowledge of the business help the IS department?
If the IS department gets a call from somebody with a question, the IS staff can use their knowledge of the business and their knowledge of the technology designed to mirror that business. If they can answer the user's question, then they've done their job. That's my goal, and that should be the goal of any CIO.

What are the measurable benefits of the business/IS interaction?
The productivity that IS systems can bring to an organization—the ability to do things faster and more accurately—allows a company to grow. It would be very difficult for Kendall-Jackson, for example, to maintain the consistency and quality of our products year after year if we had to track all the inventories manually.

How can one expand the role of the CIO?
CIOs need to educate everybody in the company about what makes sense for IS in terms of return on investment. Most organizations will use their IS departments as a support function—to store data or produce reports—rather than ask them to look at the strategic needs of the business. Then, they concentrate the use of IS resources. The successful CIO will try and look for ways to use the IS resource to the benefit of the organization.

Spotlight On:

Vince Barriero, CIO, Kendall-Jackson

- **Line of Business** Wine production and distribution
- **Bio** Newly appointed CIO at Kendall-Jackson; was senior VP and CIO at Sharper Image for eight years; director of IS at Williams Sonoma for four years; project manager at Foremost McKesson
- **Day to Day Responsibilities** Serves as a bridge between the IS department and the business
- **Challenges** Integrating data from several applications that were not designed together, getting control of a network that is suffering from platform overkill and finding answers for a company that is growing very rapidly

How does IS function at Kendall-Jackson?
I see Kendall-Jackson as four business units: farming, production, sales and the corporate and administrative element. I am trying to organize the IS department to look like those four business units. Each business unit has a mini-IS team as a part of it, and the users know where to go to get help.

What we really have not been able to concentrate on is developing a database, a data warehouse, that reflects what the business looks like. That's one of my primary tasks over the next year or two: to make sure that we have developed a database that reflects the needs of this business, as opposed to just collecting pieces of information that happen to be a part of the package that we purchased.

How do you integrate IS into your business?
Start by establishing a steering committee to prioritize which of the potential projects are most important to the company. The steering committee should be composed of senior management and the CIO. The goal is to try to determine how best to use the IS resource. My role at Kendall-Jackson is to facilitate and to make everyone aware of other projects, to get [everyone] on the same page and get to a consensus. This is much better than trying to work in a vacuum.

–Alex Frankel

Keeping pace with technology

Channel assembly: Opening new possibilities in corporate IS procurement.

Quarterly information for CIOs

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15

more than memory

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A change is in the air…

1998 promises a host of technology innovations geared to boost corporate computing power and efficiency. But one of the biggest changes in technology this year won't be a product innovation—it will be the refinement of how technology is integrated and delivered to corporate accounts.

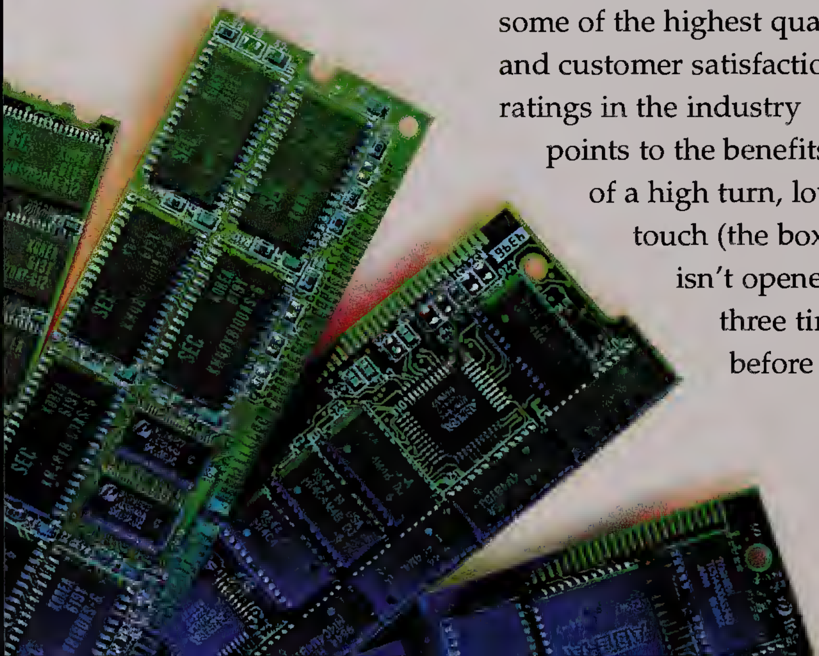
For the last year, system manufacturers, component suppliers and resellers have invested millions of dollars and countless hours in ongoing efforts to adopt channel assembly initiatives. The goal of these efforts is to increase overall customer satisfaction levels by bringing down the time between order and delivery, and reducing the overall price of customized solutions to corporate accounts.

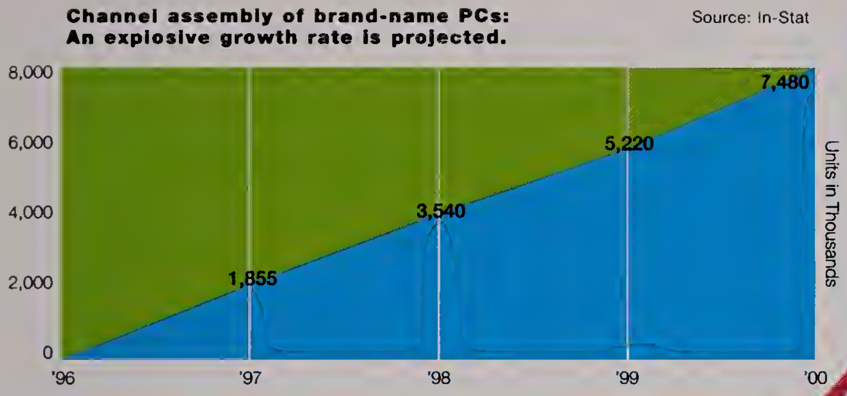
15

Someone's knocking on your door…

The entry of Gateway and Dell into corporate America has legitimized the direct model for large accounts. Their ability to quickly deliver customized solutions with some of the highest quality and customer satisfaction ratings in the industry points to the benefits of a high turn, low touch (the box isn't opened three times before it lands at your door), build-to-order model. The primary goal of channel assembly is to completely eliminate the pricing delta between direct and indirect channel suppliers.

Today, every major system manufacturer is deep in the throws of channel assembly. IBM's Authorized Assembly Program (AAP) is by most accounts furthest along. Their program targets the largest integrators, distributors and resellers, and provides a variety of base models from which resellers can





Channel assembly of brand-name PCs: An explosive growth rate is projected.

Source: In-Stat

build customer-specific solutions without removing already installed options. This program affects everything from forecasting to inventory control to final assembly, making the bridge between the OEM and integrator more seamless than ever before.

Large resellers and integrators like the program because they can now build specific solutions from a stock of fewer base models. OEMs like the program because they can limit their exposure on stock rotation and reduce price protection terms, now that the forecasting burden on resellers has been lightened.

Someone's ringing your bell...

Clearly, channel assembly is a hot topic for those responsible for delivering solutions. But what does it mean for you, and how will the logistic changes translate into better overall service?

There are four major areas of improvement you should expect as channel assembly gains momentum throughout 1998.

More choices

Previously, an IS manager may have had a choice between two different video cards from the OEM. Now, integrators can quickly and cost-effectively provide a variety of alternatives from multiple suppliers. For example, if a specific brand of video card is desired to support an in-house application, there's no need for the integrator to pull out the standard video offering since the base model doesn't include a video adapter. You will also now be able to request specific upgrade brands to match currently installed components, like video cards, or high speed NICs. Expanded options also translate into lower prices since the reseller can offer attractive alternatives to the limited OEM solution.

15

By any other name

To extend brand awareness during the channel assembly transition, many OEMs are packaging their offering as a unique program. In essence, they all target the same goals with slight differences in logistics and controls.

IBM AAP: The Authorized Assembly Program name hints at IBM's control over parts, processes and its certification of the largest national and regional integrators to assemble products.

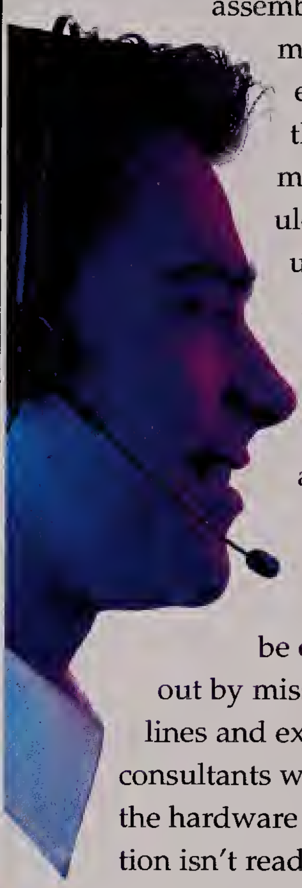
Compaq CCP: Compaq's Channel Configuration Program is complimented with "build-to-order" (BTO) and more customized "configure-to-order" (CTO) programs where the final configuration responsibilities reside with Compaq.

HP Channel Assembly: In addition to its channel assembly offering, Hewlett-Packard's resellers can also order custom configurations of HP components, shipped directly to customers by HP.

VisionTek is taking an active role in helping its reseller partners design and implement effective channel assembly programs to better serve corporate customers. *For more information on VisionTek, please visit* **www.visiontek.com**

Weeks to days

The key to channel assembly's success is in the logistical details. Millions of dollars are being invested in designing systems that will cut order to delivery time from weeks to days. The inclusion of third party suppliers in the channel assembly process means, for example, that a $250 memory module won't hold up a major server installation. Time is money, and the savings in systems cost can be easily wiped out by missed deadlines and expensive consultants waiting for the hardware if the solution isn't ready for the scheduled installation.



Better value

With integration centers carrying thousands of peripheral and upgrade choices, the opportunity to configure a solution that leverages multiple third party upgrades can reduce the overall system cost. By reducing the number of models, OEMs can achieve much better forecasts, increase turns and bring down their cost of business. The bottom line for you: better value than ever before.

Focus on service

As channel assembly continues to develop, your reseller contact will spend less time tracking down orders, making phone calls to the OEM, etc. Channel assembly should allow them to invest more time learning about your business and creating value-added offerings like asset management tracking, integration consulting and capacity planning.

Open the door and let them in

In the end, channel assembly is an affirmation that nothing ever stands still. Like the ongoing innovations introduced by system OEMs, the reseller channel is constantly evolving to provide more value. Today, a small percentage of your actual hardware investment is being built using channel assembly processes. Resellers are still learning to use this new model. The process will take some time, but the benefits promised by channel assembly will be well worth the wait.

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Keynote Presenter

Tom Peters

April 26-29, 1998
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Conference Overview
Lynda Rosenthal and Joseph L. Levy

The Partnership Pathway
Applying IT to business partnerships

Agenda
Detailed information about general sessions, business briefings, scheduled meals and activities throughout the conference.

Corporate Hosts
During the conference, our Corporate Hosts, an exclusive group of innovative, visionary companies, will display a wide range of solutions that address strategic and operational IT issues.

Companion Program
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Register using our online enrollment form at *www.cio.com* or complete the form on the back of this brochure and fax it to 508 879-7720. You may also call us toll-free at 800 366-0246.

Conference Overview

Alliances among strategic business partners, key customers and sought-after employees are being powered by information technology and the CIO. This new responsibility, as well as innovative approaches to these partnerships, will be examined at the latest *CIO Perspectives*℠ conference, **The Powerful IT Organization: Forging Customer, People and Business Partnerships**, April 26-29, 1998 at the Hyatt Grand Cypress, Orlando, Fla.

Explore how IT executives can leverage their roles to create leadership initiatives that drive strategic alliances, strengthen customer relationships, expand and challenge business expectations and attract and retain the highest level of professional staff.

Keynote presenter **Tom Peters**, president, *The Tom Peters Group*, and author, *The Circle of Innovation*, will examine innovative business strategies and how CIOs manage them. Other featured presenters include **Ralph J. Szygenda**, vice president and CIO, *General Motors Corporation*, **Bran Ferren**, executive vice president, creative technology, *Disney Imagineering*, **Peter DeLisi**, founder and president, *Organizational Synergies* and **Hal J. Upbin**, president, *Kellwood Company*. Our conference moderator will once again be **Jim Wetherbe**, director, MIS Research Center, *University of Minnesota*, Federal Express Professor of Excellence, Center for Cycle Time Research, *University of Memphis*. Please read the agenda on the following pages and see the other experts you'll meet in Orlando.

To enroll, or for more information, please visit our Web site at *www.cio.com/conferences* or complete the enrollment form on the back of this brochure and fax it to 508 879-7720. Questions? Call us at 800 366-0246. If you want to learn about making *your* organization more powerful, register now!

Regards,

Lynda Rosenthal

Lynda Rosenthal
Senior Vice President and
General Manager
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Joseph L. Levy
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The Partnership Pathway

By Megan Santosus

Applying information technology to support the goals of the business is one of the top priorities on any CIO's agenda. Yet, the pledge to align IT with the business has taken on the familiar ring of a mantra: Many CIOs say it with conviction, but they don't know what it means or how to accomplish it.

Think of business/IT alignment as a destination, and CIOs as the pilots who need to consult a road map to get there. Simply implementing technology — no matter how cutting edge — is no longer sufficient, because sooner or later every business on the block can buy the same off-the-shelf software or link up to the same high-speed network. Successful alignment efforts begin and end with strong partnerships, between not only IS and the business, but encompassing customers and suppliers as well. In organizations where information technology is a critical component to ongoing operations and strategic initiatives, CIOs have the opportunity to become the cornerstone of effective partnerships.

"Eighty percent of problems in relationships are due to misunderstandings."

Consider the case of **Ralph Szygenda**, vice president and CIO at General Motors Corp. At GM since June 1996, Szygenda is spearheading an effort to build an IS group that can standardize processes and systems across business units, slash costs by millions of dollars, collect and distribute customer information and shave months off production cycles. These are certainly difficult goals when GM's size is also considered: more than 600,000 employees, nearly $165 billion in revenues and an IT budget of about $4.5 billion.

If anyone needs a talent for building partnerships, it's Szygenda. He spent much of his first months on the job hiring business unit and regional CIOs who help spread the word and implement the mission at GM's seven business units.

At every level of GM, IT is seen as a way to help the world's largest company stay nimble and flexible — strategic necessities in the cutthroat automotive industry. Szygenda's role is high-profile and requires adept leadership skills and a keen understanding of how technology can support business imperatives.

Despite the enormity of his challenge, Szygenda may have one thing easier than his counterparts: Reporting to GM's vice chairman, he regularly commands an audience at the highest levels. Other CIOs may have to work hard just to be heard by executive management. As a result, learning to communicate effectively is one of the top prerequisites CIOs need if they want to form productive partnerships.

Jim Wetherbe, director of the MIS Research Center at the University of Minnesota, feels that CIOs have not placed as much emphasis on communication skills as they should. "Eighty percent of problems in relationships are due to misunderstandings," Wetherbe asserts. "If CIOs did a better job of understanding their peers and explaining where IT fits in, a majority of their problems would go away."

In general, CIOs need to better explain what they are trying to do within their organizations and how technology will help them accomplish their objectives and those of the organization. "CIOs really have to change their attitude," Wetherbe says. "Creating win/win situations requires good listening and presentation skills."

According to **Pete DeLisi**, president of Organizational Synergies, a consulting firm that specializes in strategy development, CIOs need to market themselves and demonstrate the value of IT in order to build strong relationships. Once those relationships are established, CIOs will have a tremendous opportunity to become organizational leaders. In particular, DeLisi views knowledge management and strategic planning as prime areas where CIOs can take leadership positions, since these are natural components of running an IT shop.

Before CIOs can seize such an opportunity, they have to do some basic groundwork. DeLisi states that CIOs spend too little time with internal clients, which makes it difficult to communicate effectively. "CIOs should spend 20 percent of their time with internal clients, and most don't," he says. And of those CIOs who do spend that kind of time face-to-face with clients, it's often when there's a crisis and they're simply putting out fires.

DeLisi maintains that such reactive relationships can't be the foundation of productive partnerships. When CIOs are reacting to problems, there's little time to spend sitting down with clients and listening to their needs or observing how they work. "Just spending time with clients to see what's going on should be part and parcel of how CIOs work," he says. Contrary to being unproductive, time spent with clients can lead to positive, serendipitous discoveries that could never happen if CIOs remain behind their desks.

When solid relationships are established, only then can CIOs set out on the road to reaching IT/business alignment. Increasingly, businesses are no longer preoccupied with using IT to cut costs or become more efficient. According to management expert **Tom Peters**, what's essential for businesses these days is innovation and customer-focused operations.

Self-described gadfly **Tom Peters** has recently written *The Circle of Innovation*, the latest addition to his line of management books that include *In Search of Excellence*, *Thriving on Chaos* and *Liberation Management*. As the title suggests, Peters is interested in exploring the ins and outs of innovation and how organizations instill a culture that excels at innovation. Below are some of the tenets Peters ascribes to innovative organizations:

- Innovative organizations seek to create new markets, often through acquiring smaller players. The current merger mania — when the goal is simply to buy marketshare — can often be counterproductive to innovation efforts.
- Sometimes forgetting is better than learning. Innovative companies don't have a "not invented here" culture. By "forgetting" organizational legacies, companies can free up people to think about completely news ways of doing business.
- Organizations need to borrow a metaphor from sports teams and Hollywood producers. Peters calls such organizations that create customer-focused teams "talent-based enterprises."

Peters will tell you how to encourage innovation in your organization.

His latest book, *The Circle of Innovation*, he highlights the characteristics of successful companies and what makes them innovative. Peters contends that customer self-service (i.e., Federal Express), and adding value through talented project teams (much like how Hollywood makes movies), are the hallmarks of innovative and strong companies. While information technology — and CIOs by association — are important elements in the innovation equation, Peters places a huge emphasis on creating the right culture where innovation can thrive. *(See sidebar.)*

Birute Regine and **Roger Lewin** are also concerned with the cultural side of business. Specifically, Regine, who is a developmental psychologist, and Lewin, who is an associate of the Peabody Museum at Harvard University, are interested in applying the laws of complexity theory to businesses and how management decisions are made.

Although relatively new to management, complexity theory is a staple among the biological and physical sciences and emphasizes the importance of figuring out the underlying relationships and rules that occur in large, seemingly chaotic systems. An understanding of such relationships and rules often leads to the discovery of basic patterns that can be used to predict behavior and events.

Regine and Lewin are examining how complexity theory relates to relationships — both within and among organizations. "What are the relationships among people and what kind of simple rules within an organization do people follow?" Regine asks rhetorically. If innovation is prized in an organization, for example, but failure is not tolerated, then "rules" dictate that few people will go the extra mile toward achieving innovative breakthroughs.

> **"Learning to communicate effectively is one of the top prerequisites CIOs need."**

Regine and Lewin are collaborating on a book that will explore, from the CEO on down, what it's like to be in an organization. "We want to help lead people to an awareness of organizational rules, so that creativity among employees is enhanced," Regine states.

In addition to creativity, Regine asserts that employees need to share a sense of contributing to the success of their organizations by feeling as if they have an opportunity to affect the bottom line. "We're moving away from a command-and-control paradigm to one that emphasizes care-and-connection," she asserts. More than most executives, CIOs have an understanding of what makes a complex system tick, and therein lies their opportunity to lead their organizations into the next millennium.

CIO

Megan Santosus is Features Editor, Web & Print at *CIO* magazine. She can be reached at santosus@cio.com.

The Powerful IT Organization:

Forging Customer, People and Business Partnerships

SUNDAY, APRIL 26

3 p.m. - 6 p.m.
Conference Registration

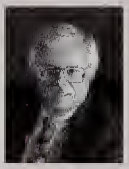
7 p.m. - 9 p.m.
Welcome Reception and Registration

9 p.m. - midnight
Hospitality/Networking

MONDAY, APRIL 27

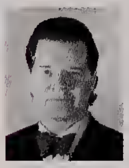
7:30 a.m. - 8:15 a.m.
Breakfast

8:15 a.m. - 8:20 a.m.
Welcome & Opening Remarks



Joseph L. Levy
President, CEO and Group Publisher
CIO Communications, Inc.

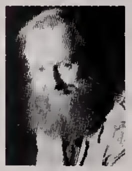
8:20 a.m. - 9:30 a.m.
Partnering Through Communication



Dr. Jim Wetherbe
Director
MIS Research Center
University of Minnesota
Federal Express Professor of Excellence
Director
Center for Cycle Time Research
University of Memphis

Stanford University's survey of their most successful MBAs asked them to reflect on the single most important skill resulting in their success. Communication skills was the answer. It turns out that 80% of the problems we have in our personal and professional relationships are due to misunderstandings. Eliminate those, and 80% of the problems go away. This session will draw from Dr. Wetherbe's thought-provoking book *So, What's Your Point?* to provide practical, straight-forward suggestions to improve communication skills.

9:30 a.m. - 10:30 a.m.
Imagine: The Collaboration of Technology and Creativity



Bran Ferren
Executive Vice President
Creative Technology
Disney Imagineering

Bran Ferren sits on the cusp between the worlds of technology, creativity and entertainment. In Ferren's view, the changes in the world economy and this new technological society are all part of a larger story. As the Internet evolves, so does our ability to tell stories and to have real impact on our world. Embracing the creative mind gives people the opportunity to invent their own jobs and evolve their own futures. This session will explore the implications of creativity and information technology. Ferren will share how he has brought some of the greatest technological minds of our time to collaborate with him at Disney Imagineering and how he captures and attracts imaginations.

10:30 a.m. - 11 a.m.
Coffee Break

11 a.m. - noon
Winning Strategies for IS Staffing: How to Attract, Develop and Hold onto the Right People

Abbie Lundberg
Editor in Chief
CIO magazine

Rick Swanborg
President
ICEX

With the current ongoing staffing crisis, it's more important than ever that CIOs know they are investing their recruiting and training dollars in the right people and skill sets. This session will present the results of a new survey conducted by CIO Communications and ICEX as part of our *Best Practice* series. We'll explore changing organizational models and the different types of skill sets needed in the new environment. You will learn how to conduct a gap analysis on current and future positions, as well as which practices are most effective for filling your own skills gap.

Noon - 1:15 p.m.
Luncheon

This author's most recent book will be distributed at the conference.

1:15 p.m. - 2:15 p.m.

The General Motors Story: Organizing to Achieve

Ralph J. Szygenda
Vice President
CIO
General Motors Corporation

Alliances and partnerships between IT and its customers and suppliers are critical for the successful integration of IT and the organization's business goals. Key elements in fostering these needed relationships are the architecture of the organization and IT processes. General Motors offers a case history on organizational design where business, technology and customer relationship accountabilities are matrixed. Together they have the responsibility to develop the internal and external relationships necessary to fully understand functional business processes and goals, and to assure alignment between IT solutions and business objectives.

2:30 p.m. - 3:15 p.m.

Business Briefings

3:15 p.m. - 3:45 p.m.

Coffee Break

3:45 p.m. - 4:30 p.m.

Business Briefings — Repeated

6:30 p.m. - 8 p.m.

Reception

8 p.m. - midnight

Hospitality/Networking

TUESDAY, APRIL 28

7 a.m. - 8 a.m.

Breakfast

8 a.m. - 8:45 a.m.

Creating Security on the Electronic Frontier

Christine Varney
Partner
Director
Internet Practice Group
Hogan & Hartson LLP

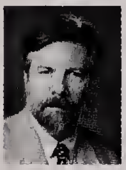
Formerly, Commissioner to the Federal Trade Commission

Join Christine Varney for a candid discussion of the four components of trust, why they are important to the success of electronic commerce and how the government will partner with business to ensure it. This session will explore the legal issues involved in implementing standards and regulations required to guarantee security for electronic business transactions and who should determine them. Varney will share insights from her assignment on President Clinton's Critical Infostructure Commission and her appointment as Commissioner to the Federal Trade Commission.

8:45 a.m. - 10 a.m.

The Intranet Hits Hyperdrive

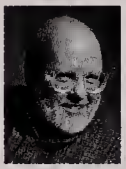
Moderator



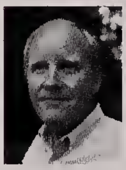
Lew McCreary
Editorial Director
CIO magazine

Panelists

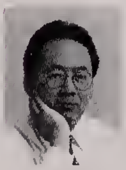
Ron Aderhold
Vice President
Internet and E-Commerce
Technologies and Strategies
National City Corporation



Tim Horgan
Vice President
Technology
CIO Communications, Inc.



Steve Telleen
Area Director
Internet and Intranet
Strategies
Giga Information Group



Sherman Woo
Director
Global Village Labs
U.S. West

Predictions that the Web might one day become the enterprise operating system are less far-fetched today than ever before. At many organizations, intranets that were originally conceived as common repositories for publishing and sharing business information are quickly adding new richness and value in the form of operational functionality. More and more, intranets are tools for knowing and doing, not just for storing. A Web front end can endow legacy applications with unimagined flexibility, usefulness and extensibility, and Web-based programming techniques can be applied to accomplish "neutron reengineering." This panel will explore the Intranet's maturation into a powerful transactional and operational platform.

10 a.m. - 10:30 a.m.

Coffee Break

10:30 a.m. - 11:15 a.m.

Business Briefings

11:30 a.m. - 12:15 p.m.

Business Briefings — Repeated

12:30 p.m. - 1:30 p.m.

Luncheon

1:30 p.m. - 2:15 p.m.

Business Briefings

2:30 p.m. - 3:15 p.m.

Business Briefings — Repeated

3:15 p.m. - 3:30 p.m.

Coffee Break

3:30 p.m. - 5:30 p.m.

The Circle of Innovation

Tom Peters
President
The Tom Peters Group
Author
The Circle of Innovation

The world of business is in a permanent state of chaos in which constant innovation is the only survival strategy for the individual and for the organization. So argues Tom Peters, gadfly, curmudgeon, corporate cheerleader, capitalist pig and Ur-guru (guru of gurus) of management. Peters will give ideas and tools to survive in the tumultuous years ahead, showing how the "winners" deal proactively with revolutionary changes by promoting the human imagination, fostering service loyalty and eliminating corporate dullness by leading with passion and embracing organizations as powerful knowledge networks.

5:30 p.m. - 7 p.m.

Reception with Tom Peters

7 p.m. - midnight

Hospitality/Networking

WEDNESDAY, APRIL 29

7:15 a.m. - 8 a.m.
Breakfast

8 a.m. - 9 a.m.
Complexity in Business: As if People Matter

Roger Lewin
Associate of the Peabody Museum
Harvard University
Author
Complexity, Life at the Edge of Chaos

Birute Regine
Developmental Psychologist

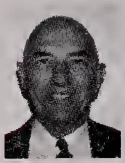
The new bottom line of business is relationships — within organizations and between organizations. Complexity theory tells us that if we paid as much attention to social processes — building trusting relationships, attending to connections and disconnections in an organization — as we do statistics, structures and demographics, our organizations would be more creative, effective, productive and profitable. For the twenty-first century, the cutting-edge question is what business ecosystem, what web of business relationships, does your company operate in?

9 a.m. - 9:45 a.m.
Managing IT to Achieve Excellence in the 21st Century

Hal Upbin
President
Kellwood Company

Hal Upbin was responsible for creating Vision 2000, a performance improvement program that encompasses all Kellwood Company business units, leveraging the company's size on the "buy side" and reengineering business processes not visible to the customer in order to perform better, faster and more economically. This presentation will detail the pressures that led to the development of Vision 2000, its goals, objectives, scope and results to date. Upbin will reveal how Kellwood has used supply chain efficiencies and consolidations to improve its business performance, which contributed to its stock price more than doubling in 18 months.

9:45 a.m. - 10:45 a.m.
CEOs Look at the IT Function



Peter DeLisi
Founder and President
Organizational Synergies

As we scan the IT arena, we see repeated evidence that the IT organization does not receive the respect that it deserves. This "gap problem" — a gap that exists in most organizations between the value that the IT organization provides and the perception of that value -- may be caused by the inability of senior IT executives to both recognize the expectations that CEOs have of them and to perform at that level. This session will detail the results of a Santa Clara University study and will offer some practical advice that IT executives can use to further their relationship with their CEO and the senior management team.

10:45 a.m. - 11 a.m.
Coffee Break

11 a.m. - 11:45 a.m.
Leveraging the Corporate Internet/Intranet

John Bullivant
Vice President
Internet and Intranet Services
Lehman Brothers

Financial institutions are often at the forefront of incorporating innovative technology into their information management infrastructure. With the advent of the World Wide Web, the accessibility of business critical information — to customers, partners and employees — has leveraged corporate relationships and optimized communication. The rigorous processes financial institutions have in place to audit and control the flow of this information are complicated by the Web. This session will explore the powerful business opportunities created by the corporate Internet/intranet and information management issues inherent in this technology.

11:45 a.m.
Prize Drawings

Noon
Closing Remarks

Jim Wetherbe

BUSINESS BRIEFINGS

Building Powerful Partnerships with Data

Andy Griebel
Director of Channel/Market Development
Acxiom Corporation

Companies today are focused on 1:1 marketing tactics that allow them to cement customer relationships. Concepts such as the thin data warehouse, real-time access to external demographic and psychographic data, and common customer keys have become a reality. The CIO is uniquely positioned to deliver these newest capabilities to your end users, including forging partnerships with marketing and other business groups to deliver timely and appropriate data to facilitate strategic and tactical decision making. We will explore ways to enhance your picture of the marketplace, re-connect with missing customers and other opportunities to build partnerships that deliver business impact.

Virtual Corporation... Tangible Benefits

Maynard Webb
Vice President and CIO
Bay Networks, Inc.

Recently named one of the "Ten Most Innovative CIOs" by *Integration Management Magazine*, Maynard Webb will discuss the foundational elements necessary to drive effective e-commerce and supply chain initiatives. He will examine the Adaptive Networking elements that empower these new IP optimized solutions, and highlight certain novel best practices in the area of program and vendor management that enabled his team to complete a comprehensive global SAP roll-out in a whirlwind 9-month period.

A Business Briefing Will Also be Presented By:

Calvin Guidry
Vice President
Performance Optimization and Recovery
BMC Software, Inc.

IT: Facilitating the Growth of People and Business Partnerships

James Ryan
Vice President
Information Management Group
Data General Corporation

The business world is moving rapidly to an all-electronic mode of operation in which companies often compete in one area and partner in others. IT is clearly the driving force in deploying systems to facilitate the growth of people and business partnerships in this new environment. Using Data General as a case study, this presentation will provide a framework and implementation pointers for deploying the necessary components to enable the new world of business: network infrastructure, open systems architecture, data warehousing, EDI, Internet and intranets and electronic commerce.

Making the Virtual Office a Reality

Presented by Dell Computer Corporation

Since mobile computing is the fastest growing segment in the PC industry, CIOs are faced with challenging decisions regarding the virtual office and implementation of relevant technologies. Organizations that understand the relevant technologies of mobile computing are better positioned to meet their business needs while leveraging applicable technologies. We will consider the challenges associated with choosing technologies that provide productivity, longevity and stability in a virtual office.

The CIO is the CEO of the Future — Leveraging the Knowledge Within

Phil Andrews
Vice President
Corporate Office of Strategy
EDS

Todd Carlson
CIO
EDS

The future will require an enormous ability to master information and knowledge of the enterprise, both as key elements of the infrastructure and as assets. CIOs are increasingly involved in the design and implementation of burgeoning enterprise knowledge management endeavors. In this two-part session, we will consider the role of the CIO as the CEO of the future, with particular attention given to the CIO's role in knowledge management initiatives.

A Better Way to Align Business and IT Goals

Charles L. Gold
Research Fellow
Center for Technology Enablement
Ernst & Young LLP

Peter Greis
Senior Manager
Center for Technology Enablement
Ernst & Young LLP

Current IT research reveals that companies with aligned business/IT goals show improved performance over those companies that do not. Even though shared business/IT perspectives are critical in this age of alliances among business partners, alignment is elusive without a defined path and common starting point. This session will review proven techniques for promoting a deeper understanding of how business activities drive IT needs. You'll be introduced to a model — the IT Process Landscape — that will help your management team align its IT efforts with its business objectives, and support more effective strategic planning and budgeting.

Using Information Technology to Eliminate the Boundaries of Time and Distance

William Hewitt
Vice President
Worldwide Marketing
Hyperion Software

Hyperion's client, Young & Rubicam's mission is simply stated — to be their clients' most valued business partner for building brand recognition. When you are serving a multi-national customer base from over 350 offices around the globe, this is not a simple feat. The agency's technology infrastructure enables it to communicate, collaborate and coordinate its international operations despite unique local requirements and dissimilar financial systems. This case study explores how Y&R achieved productive, profitable local operations while gathering information from many dissimilar systems to get a global view of its business, thereby allowing it to make more informed decisions and react quickly to change. We will also consider how Y&R forges partnerships with its clients who depend on the agency's ability to understand both regional and international views of their programs.

Real Time Intrusion Detection

Alan Fideli
Manager
Internet Emergency Response Service
IBM Corporation

Greater need for confidence in the security protection for corporations and for the customers they serve has increased. Companies must be able to intercept intruders in real time, and use that information to become better informed about the real threat in using Internet commerce. This presentation provides management insight on the state of the art with Real Time Intrusion Detection, and highlights issues and opportunities to use this technology to permit greater confidence with Internet connectivity.

There Is No New Money on the Internet — But Opportunity Abounds!

Michael Sullivan-Trainor
Director
Worldwide Internet Research
IDC

The chief opportunity of the Internet is to capture cost savings or additional market share from existing investments and purchases that can be traced to traditional, non-Internet channels. The steady growth in numbers of Internet access devices and users will cause spending to increase from $3 billion worldwide to more than $220 billion in 2001. In response, companies are investing in intranet extensions of their corporate infrastructures to increase employee productivity, adding extranets for suppliers and distributor relationships and building up their Internets to project their presence into the customer marketplace. Strategic alliances are also tested and expanded to support this revolutionary change in business development. This session will explore the ways these investments and partnerships can work together.

Business Agility: The Key to Valued Partnerships

Claude Wimberly
Director
Enterprise Marketing
Intel Corporation

Forging successful relationships that cross company lines depends on your ability to deliver value. A flexible, adaptable computing infrastructure empowers you to meet your customer's dynamic demands. High-performance, low-cost processing power, combined with the broadest range of tuned and optimized applications, offer IT organizations a new entry-point for solving business critical computing problems. This session will consider how a leading company has increased its business agility by adopting industry standards-based computing technologies, and examine how to incorporate lean clients, network PCs, workgroup servers and business critical systems to build an agile IT environment, thus enabling stronger partnerships.

Double Your IT Capacity Without Increasing Your Budget

Rick Pleczko
Senior Vice President
Product Management and
Business Development
LBMS, Inc.

Companies that pay attention to process and project fundamentals experience productivity gains of 100% or more versus the average performer. Improving the ability to deliver projects consistently on-time and in-budget is the most important effort a CIO can launch. The key to better project delivery is leveraging standardized and reusable best-practice processes. This session will explore the strategies, implementation and payback of best-practice project management for breakthrough business impact.

Technology as a Competitive Advantage

Kevin Oye
AMCS Director
Strategy and Development
Lucent Technologies

The delivery of information in a timely manner is one way the current IT professional of today is crucially involved. However, the IT professional in the 21st century will increasingly seek new ways of doing business and using new technologies that allow companies to continually lower operating costs, enable new applications and provide better customer service. This session will discuss new technologies (including those blending voice, video and data) and highlight customer scenarios where forward-thinking companies have expanded and enhanced their competitive advantages and delivered creative ways of doing business.

IT Strategies to Gain the Competitive Advantage: Harness the True Power of Corporate Inter/Intra/Extranets

David Rowley
Vice President
Business Development
MKS

If the Web is effectively exploited as an information tool, corporations can leverage billions of dollars already invested in existing data by empowering employees, suppliers and customers to actively collaborate on day-to-day business operations. Reconciling the needs of the technical and non-technical contributor for freedom to publish and the flexibility to use the tools of choice, along with the corporation's need for automation and process control remains the challenge for CIOs. Learn how corporations such as Chrysler, Nations Bank and America Online are maximizing their contributors' potential using MKS Web Integrity to achieve their business goals.

New Dimensions in the Data Center

Bob Witt
Vice President
Information Services
CIO
Sequent Computer Systems

We will explore paths to a data center infrastructure that supports widely differing application workloads, radically variable user profiles and rapidly changing business requirements. We will also consider the practical issues when implementing tried-and-true data center disciplines and service level agreements within an "open" data center environment.

The Year 2000: The Business Challenge of the New Millennium

John Todd
Vice President
Infrastructure Services
Sprint Business

The Year 2000 — we all know it's coming, and that passing into the next century is a significant event. However, most business professionals are aware that the year 2000 also means that they must make significant changes to their computer systems in order to do business in the next century and beyond. But what about business challenges? For the communications industry, the challenges are even more complex because the major carriers handle millions of date-sensitive electronic transactions every day. This session will discuss the programs Sprint has implemented to address the issues associated with the Year 2000 compliance and the impacts it may have on Sprint, as well as its business customers.

A Business Briefing Will Also be Presented By:

Michael J. Walsh
Director of Marketing
Sun Microsystems of Canada

Walsh will explore the new opportunities available for all organizations to use the new dynamics of the network to create a sustainable advantage. He will also examine why the CIO and his/her organization are at the center of this economy. Topics will include: the value proposition of IT in the networked enterprise; five of the biggest trends; the increasing role of the network; Java as executable content; and innovation and the new infostructure.

Business Briefings will also be offered by:

Cabletron Systems, Inc.
Compuware Corporation
Hewlett-Packard Company
Informix Software, Inc.
Lockheed Martin Corporation
StorageTek
VideoServer, Inc.

Companion Program Agenda

Sunday, April 26

3 p.m. - 6 p.m.
Conference Registration

7 p.m. - 9 p.m.
Welcome Reception and Registration

9 p.m. - midnight
Hospitality/Networking

Monday, April 27

8:30 a.m. - 9:30 a.m.
Stretch and Tone Class

9:30 a.m. - 10:30 a.m.
Companion Breakfast

Noon - 1:15 p.m.
Luncheon with conference participants

1:30 p.m. - 5:30 p.m.
Leu Botanical Gardens and City of Orlando Tour

6:30 p.m. - 8 p.m.
Reception

8 p.m. - midnight
Hospitality/Networking

Tuesday, April 28

7 a.m. - 8 a.m.
Breakfast with conference participants

10 a.m. - 10:30 a.m.
Coffee Break

12:30 p.m. - 1:30 p.m.
Luncheon with conference participants

3:15 p.m. - 3:30 p.m.
Coffee Break

3:30 p.m. - 5:30 p.m.
Keynote session with Tom Peters

5:30 p.m. - 7 p.m.
Reception with Tom Peters

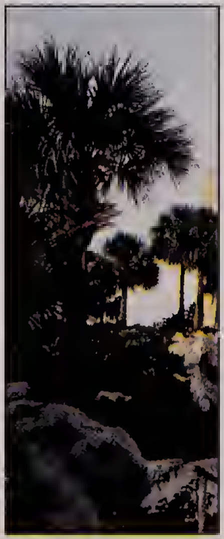
7 p.m. - midnight
Hospitality/Networking

Wednesday, April 29

7:15 a.m. - 8 a.m.
Breakfast with conference participants

10:45 a.m. - 11 a.m.
Coffee Break

Hyatt Grand Cypress Orlando, Florida



The spectacular beauty of the Hyatt Grand Cypress features lush gardens, exotic birds and tropical plants combined with the 45-hole Jack Nicklaus signature golf course, a large white sand beach on a 21-acre lake, professional tennis facilities and a complete health club. The Hyatt is adjacent to Walt Disney World, 20 minutes from downtown Orlando and Orlando International Airport and is convenient to a variety of area attractions.

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To enroll, visit our Web site at *www.cio.com/conferences* or call 800 366-0246.

ACXIOM

Acxiom can help you tap into the valuable data captured in your operational systems and make it part of an accurate, comprehensive and accessible warehouse of customer information. Acxiom's expertise in data integration assists you in cleansing and organizing your data as well as integrating external data to transform it into customer knowledge and drive powerful decision support applications. With expertise in industries such as retail, banking/finance, insurance, publishing, telecommunications and utilities, Acxiom helps CIOs deliver timely and appropriate information to end users throughout the enterprise.

Bay Networks

Bay Networks, Inc. (NYSE: BAY) is a leader in the worldwide networking market, providing a complete line of products that serve corporate enterprises, service providers and telecommunications carriers. The company offers frame and ATM switches, routers, shared media, remote and Internet access solutions, IP services and network management applications, all integrated by Bay Networks' Adaptive Networking strategy. With headquarters in Santa Clara, Calif., Bay Networks markets its products and services around the world, providing 7x24 support coverage. For additional information visit the company's World Wide Web site at *www.baynetworks.com* or call 800 8-BAYNET.

BMC SOFTWARE

BMC Software, Inc. (NASDAQ: BMCS) is a global leader in the development of more than 160 computer software solutions that improve the management of business-critical applications and data, as well as optimize the performance of that critical data in complex computing environments. BMC Software is the world's 12th largest independent software vendor and a Forbes 500 company, with annual revenues exceeding $560 million in fiscal 1997. The company is headquartered in Houston, Texas with offices, distributors and agents in 50 markets worldwide. For more information on BMC Software, visit *www.bmc.com* or call 800 841-2031 or 713 918-8800.

CABLETRON SYSTEMS

The Complete Networking Solution™

Cabletron Systems is a leading developer, manufacturer and marketer of standards-based LAN, WAN and ATM networking solutions. Through its advanced switching and enterprise management products — coupled with strategic industry partnerships — Cabletron provides the infrastructure to seamlessly support converging voice, video and data resources from one integrated platform. All of the company's solutions share a common goal of reducing operating costs, simplifying administration and improving productivity from top to bottom. Cabletron's award-winning solutions include industry-leading SmartSwitches and SPECTRUM enterprise manager.

COMPUWARE.

Compuware is the world's leading provider of software and services supporting the complete application lifecycle. We believe that the application reflects our customers' "intellectual property" and is the core of their IT infrastructures. Compuware supports application development (UNIFACE), testing and implementation (File-AID, XPEDITER, Abend-AID, QACenter), and systems management (EcoTOOLS). With over 4,300 professional services staff, we offer a wide range of consulting services, from large-scale systems and project management to Year 2000 migrations to Internet/intranet development.

Data General

Data General (*www.dg.com*) has long been a company known for technology leadership and innovation. We specialize in servers, storage products and services for information systems users worldwide. Our strength lies in leveraging the latest commodity technologies to build scalable, high-availability systems. Our product lines include Intel architecture-based AViiON servers with up to 32 processors, fault-tolerant CLARiiON disk arrays, and Internet appliances from our THiiN Line group.

Corporate

DELL™

Ranked in the top 200 of Fortune 500 companies, **Dell Computer Corporation** is the world's leading direct marketer of computer systems, based on revenues of $11 billion for the past four quarters. Dell designs and customizes products and services to end-user requirements, and offers an extensive selection of peripherals and software. With headquarters in Austin, Texas and offices in 28 countries outside the United States, Dell products are available in more than 140 countries and territories. Dell employs approximately 11,000 people worldwide. Information on Dell and its products can be obtained by accessing the Dell World Wide Web site at *www.dell.com* or by dialing its toll-free number 1-800-Buy-Dell.

EDS

EDS is a professional services firm that applies consulting, information and technical expertise to enhance our clients' business performance. We leverage the full potential of information and technology through a portfolio of offerings that create significant value for our clients worldwide. EDS applies a range of ideas and technologies to help clients succeed in the energy; communications; manufacturing; distribution and retail; finance and insurance; travel, transportation and logistics; health care; and government services industries. For more information about EDS, visit our Web site at *www.eds.com*.

ERNST & YOUNG LLP

Ernst & Young LLP, a leading professional services firm, today operates one of the world's largest and most influential management consulting practices. Our business improvement specialists create and implement solutions for clients that help them to improve operational efficiencies, grow their companies and use capital effectively. Ernst & Young consultants work with leading companies all over the world on large-scale business improvement, organizational change and information technology initiatives. Our industry-leading methods and tools provide clients with measurable and rapidly-realized business value.

hp HEWLETT® PACKARD

Hewlett-Packard Company (HP) is a leading global provider of computing, Internet and intranet solutions, services, communications products and measurement solutions. It is the second-largest computer supplier in the world, with computer-related revenue in excess of $35.4 billion in its 1997 fiscal year. HP has 121,900 employees and had revenue of $42.9 billion in its 1997 fiscal year. HP is extending its acknowledged worldwide leadership position in enterprise computing to the Internet and intranet marketplace. HP, which operates the largest intranet in the world, will continue to expand its Internet expertise by providing Internet-ready products and services for business solutions targeted from small office/home office to the enterprise. HP continues to set industry standards for secure Internet servers and will continue to be the "trusted advisor" customers rely on to build their own intra/Internet solutions for their competitive advantage.

Hyperion. SOFTWARE

Hyperion Software Corporation (NASDAQ: HYSW) provides software solutions for better business understanding and improved financial performance. Hyperion's Internet-enabled applications support and enhance enterprise-wide processes including planning, budgeting, forecasting, consolidation and business analysis. With $223 million in sales for the fiscal year ending June 1997, the company's solutions are in use by more than 3,300 organizations worldwide. Hyperion's customer base includes more than 50 percent of the Fortune 500 and 40 percent of *Financial Times'* European Top 100. The company is ranked first worldwide in budgeting software revenue by International Data Corporation and first in financial OLAP applications by the *OLAP Report*. The company is headquartered in Stamford, Conn., and has more than 1,200 employees worldwide. Additional information is available online at *www.hyperion.com*, or at 800 286-8000.

CORPORATE HOSTS

IBM

With more than 300 successful customer recoveries worldwide, you can count on **IBM** to develop and implement recovery solutions that protect your business from unplanned events that threaten the continuity of your operations. IBM provides a comprehensive portfolio of total business protection services for large, midrange and distributed systems, as well as multi-tiered client server environments. These services include integrated risk management, disaster avoidance, consultation services, hot site facilities, voice recovery, Internet security and recovery services, Year 2000 testing services and a full range of continuity management and crisis response services. IBM Global Services offers unparalleled global capabilities in 163 countries with 113 recovery facilities in operation around the world.

IDC

International Data Corporation (IDC) is the leader in delivering reliable and insightful IT data, analysis and opinions. Founded in 1964, this worldwide organization employs more than 300 industry analysts who cover the full spectrum of technology and management areas. In a rapidly changing technology market, IS professionals rely on IDC for clarification, validation and practical guidance in their tactical and strategic IT decision making. IDC's worldwide coverage and rigorous primary research combine for a powerful resource, providing comprehensive IT authoritative intelligence on such areas as architectures, suppliers, technologies, products, services, staffing and processes.

INFORMIX

Informix Software, Inc. is the leading supplier of high performance, parallel processing database technology for open systems. Informix products also include application development tools for creating client/server production applications, decision support systems, and ad-hoc query interfaces, and connectivity software that allows information to be shared transparently from PCs to mainframes within the corporate computing environment. Informix's corporate headquarters is based in Menlo Park, CA. Visit Informix's Web site at *www.informix.com* for more information.

intel

Intel was founded thirty years ago and soon introduced the first microprocessor, changing forever the way people work, learn and communicate. Today, companies incorporate agile Intel architecture-based solutions across their business and IT environments: from Internet servers to data center systems, desktops to workstations, and laptops to network PCs. Intel supplies the computing industry with chips, boards, systems and software used as "building blocks" to create advanced computing systems. Visit Intel's Web site at *www.intel.com* for more information.

LBMS

In many organizations, any given project faces a greater than 80% probability of being over-budget, late or failing completely. Improving your ability to deliver projects consistently on-time and in-budget is the most important effort a CIO can launch. Better project delivery positively impacts all of the top initiatives an IT organization faces. **LBMS** provides industry-leading project and process management tools to give you project control and consistent, on-time, in-budget project delivery.

LOCKHEED MARTIN

Lockheed Martin Corporation has emerged as the business and technology solutions partner of choice for clients who demand competitive, value-added innovation in their information systems. With $6 billion in IT sales and more than 40,000 information professionals worldwide, Lockheed Martin offers business and IT architecture services, applications and systems integration, and information processing operations for commercial and government customers. Our experience spans 30 years of information management for clients in markets such as retail, manufacturing, distribution, health care and finance as well as state and local governments.

Corporate

Lucent Technologies
Bell Labs Innovations

Increasingly, business customers want end-to-end communications solutions that address all their needs. As you look to optimize your voice, data and video networks, you are also looking for ways to protect the investment you have made in these networks. From single-site establishments to global organizations, we work closely with our customers to deliver solutions in support of unique business objectives. **Lucent Technologies** is connecting ideas, commerce and people all around the world. Visit *www.lucent.com* for more information.

mks

Mortice Kern Systems Inc. (MKS) is a leading provider of software products in the Software Configuration Management (SCM) and Web Object Management (WOM) marketplaces. The company offers a full suite of MKS Integrity products, services and training to help users maximize productivity and better manage the software development process across multiple platforms. Headquartered in Waterloo, Canada, MKS can be reached via the World Wide Web at *www.mks.com.*

SEQUENT

Sequent Computer Systems, Inc. is uniquely capable of delivering robust and scalable Data Center Ready open systems solutions that are guaranteed to perform. Sequent minimizes customers' risk, enabling implementation of complex business applications that support critical needs, based on the breakthrough Sequent NUMA-Q architecture, a comprehensive portfolio of proven migration services and offerings, and an established set of partnerships with the industry's best-in-class.

Sprint.

We help your business do more business™

Sprint is a global communications company—at the forefront in integrating long distance, local and wireless communications services, and one of the world's largest carrier of Internet traffic. Sprint built and operates the United States' only nationwide, all-digital, fiber-optic network and is the leader in advanced data communications services. Sprint has $14 billion in annual revenues and serves more than 16 million business and consumer customers.

StorageTek®

StorageTek, the preeminent provider of network computing storage, is committed to expanding the world's access to information and knowledge. The company's products and services are used to store, transport and secure more than 100 petabytes of information, ranging from mainframe data to client/server applications to video, audio and still images. Founded in 1969, StorageTek employs 8,300 people worldwide and does business in over 40 countries. Information on StorageTek is available on the World Wide Web at *www.storagetek.com.*

Sun
microsystems

Since its founding in 1982, **Sun Microsystems** has promoted a singular vision: "The network is the computer." While others protected proprietary architectures, we focused on developing and integrating many of the core network technologies that today are at the heart of the Internet and corporate intranets. This dedication to network computing has made our hardware, software and services the choice of leading companies worldwide–in manufacturing, telecommunications, financial services and everywhere network computing is used.

VIDEOSERVER

VideoServer, Inc. (NASDAQ: VSVR) is the leading supplier of networking equipment and associated software used to create multimedia conferences that connect multiple users over wide area networks and allow them to interact as a group. The company's products provide multipoint conferencing, as well as applications for conference control, network management and bandwidth management. VideoServer sells its products to leading videoconferencing equipment suppliers, telephone carriers, conferencing service providers, computer companies and others.

Hosts

To enroll, visit our Web site at *www.cio.com/conferences* or call 800 366-0246.

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NAME ____________________

TITLE ____________________

COMPANY ____________________

ADDRESS ____________________ MAIL STOP ____________________

CITY ____________________ STATE ____________________ ZIP CODE ____________________

PHONE ____________________ FAX ____________________

E-MAIL ____________________ COMPANY WEB SITE ADDRESS ____________________

WHAT IS YOUR INDUSTRY? ____________________

YOUR NAME AS YOU WANT IT TO APPEAR ON YOUR BADGE ____________________

HOTEL ARRIVAL DATE ____________________ HOTEL DEPARTURE DATE ____________________

NAME OF COMPANION (IF PARTICIPATING IN COMPANION PROGRAM) ____________________

CPM1

CHECK ALL THAT APPLY

ENROLLMENT FEES:

☐ **IS PRACTITIONERS/EXECUTIVES**
If you are a CIO, IS executive or hold another executive position, the fee is **$1,795.**

☐ **GOVERNMENT/MILITARY**
The fee, which **includes** your hotel for three nights, is **$2,295.** *Do not make your own hotel reservations;* CIO *will make them for you.*

☐ **SALES/MARKETING/CONSULTING**
If you hold a sales, marketing, new business development or consulting position, the enrollment fee is **$5,000.** This includes executive management of consulting companies. This fee is payable by **company** check only. CIO will make the final determination of this category.

OTHER ACTIVITIES:

☐ **COMPANION PROGRAM: ($325)**
Companions must be enrolled in this program to attend any conference-related functions. Includes all scheduled meals, receptions, entertainment, companion breakfast, a stretch and tone class and a Leu Botanical Gardens and City of Orlando Tour. Conference session attendance is **not** included.

☐ **THE LEADERBOARD CLASSIC GOLF TOURNAMENT:**
Yes, I'd like to participate in the golf tournament on Sunday, April 26 at 11 a.m.
Hosted by Cabletron Systems and Lockheed Martin Corporation

☐ **I am not staying at the Hyatt Grand Cypress**

____
Name of alternate hotel

Don't miss your chance to win valuable products on Wednesday!

PAYMENT INFORMATION: *(Please make checks payable to CIO Communications, Inc.)*

☐ P.O. # *(A complete purchase order must be submitted within 10 days)*

____

☐ Credit card # ____________________

☐ AMEX ☐ VISA ☐ MC Exp. ____________________

Signature: ____________________

Business Card REQUIRED In Order To Process Registration

ATTIRE

Casual! Please, no suits, ties or business attire!

HOTEL ACCOMMODATIONS

A block of rooms has been reserved at the Hyatt Grand Cypress. We urge you to make your reservations early by calling the hotel at 407 239-1234. **CIO *will make hotel reservations for government/military participants only.*** *Be sure to identify yourself as part of the* CIO *conference to receive the conference rate. Make your reservations early and guarantee your room with a credit card, as all unreserved or unguaranteed rooms will be released on March 27, 1998. Hotel reservations, cancellations and charges are your responsibility.*

TRANSPORTATION

American Airlines is the official conference carrier. For discounted airfare, call 800 433-1790 and reference Star File #S1148AB. AVIS is the official car rental provider. Call AVIS at 800 331-1600 and reference B766657.

ENROLLMENT FEES

All enrollment fees must be paid in advance of the meeting. *Fee includes conference sessions, business briefings, corporate host displays, conference materials and scheduled meals, receptions and entertainment. Transportation, hotel and recreation are your responsibility.* ***Please note that submission of this enrollment form to CIO obligates the attendee/sender for the enrollment fee.***

CANCELLATION

ANY CANCELLATIONS OR SUBSTITUTIONS MUST BE IN WRITING. *You may cancel your conference or companion program enrollment up to March 27, 1998 without penalty. A $250 administration fee will be imposed for cancellations between March 28-April 10.* ***No refund or credit will be given for cancellations received after April 10, 1998 or for no shows.*** *You may send a substitute in your place.* CIO *reserves the right to decline enrollment to any registrant.*

To enroll CALL 800 366-0246, visit our WEB SITE at *www.cio.com* or FAX us at 508 879-7720.

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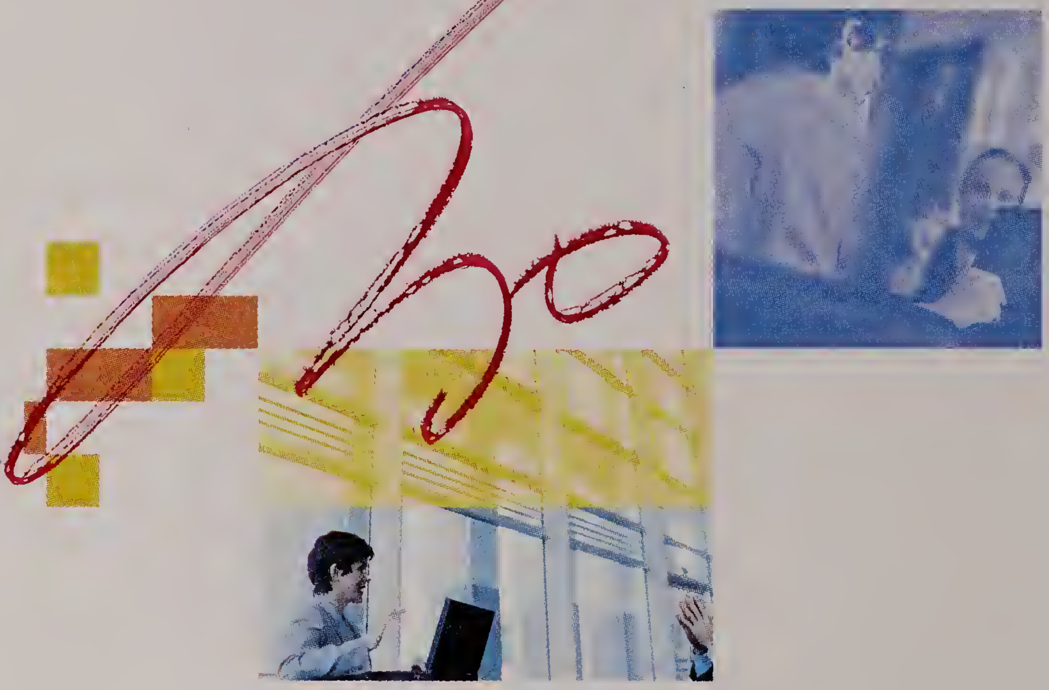

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